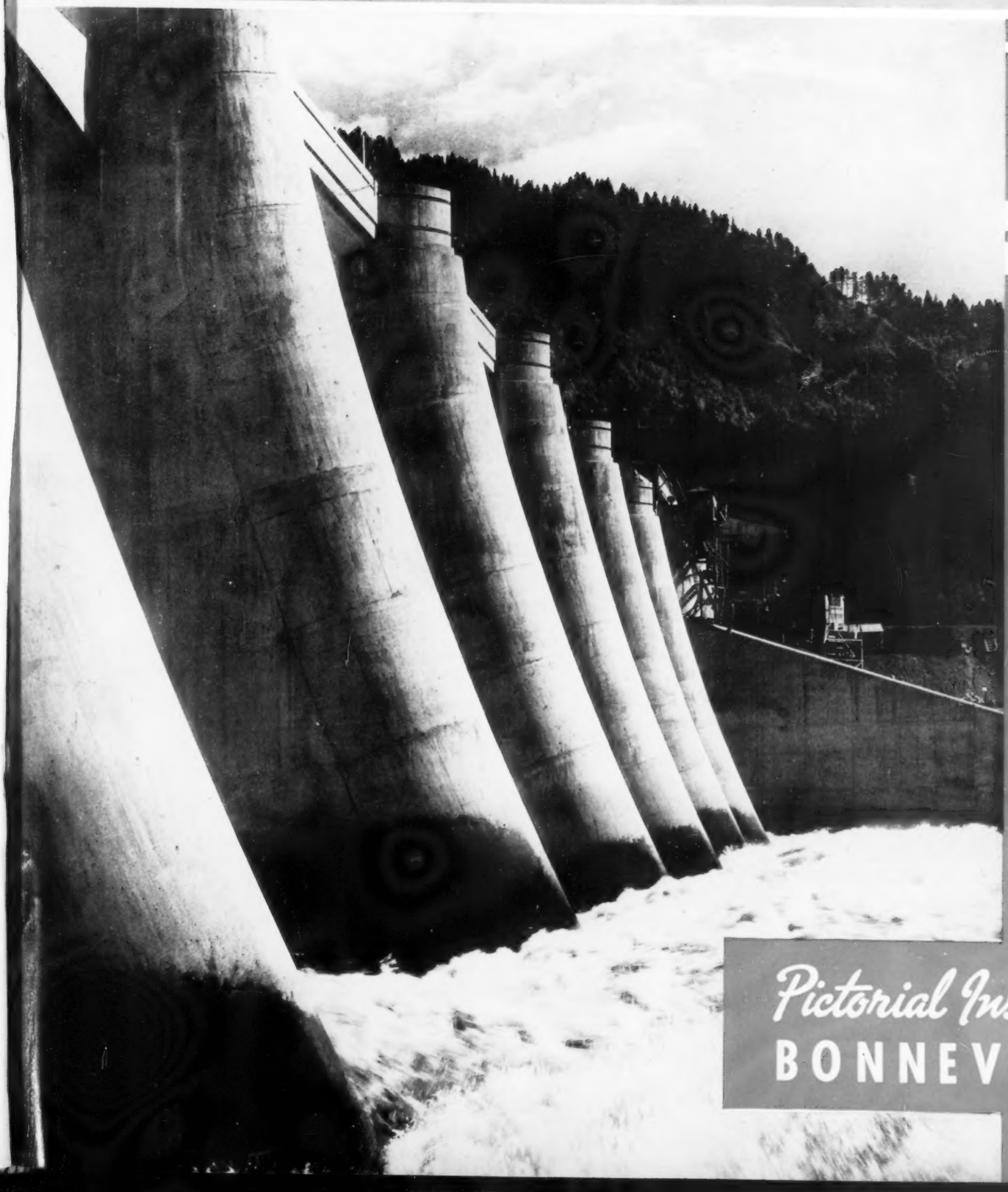
ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS



McGRAW-HILL
OF CALIFOR

MARC

1938

PRICE 25 CE

★ IN THIS IS

Pictorial Insert of

BONNEVILLE

OUR CONSUMER MAGAZINE

"Electrical Times"

REACHES 400,000 ELECTRICAL CONSUMERS EVERY MONTH

Electrical Times, now in its fifth year, has the largest circulation of any magazine in Southern California . . . over 400,000 a month . . . nearly five million a year. Month after month it reaches Edison consumers in their homes, keeps them informed of the latest developments in the electrical field. Improved appliances, the charm and beauty of modern electric homes, the uses of electricity by industry and agriculture—these and many other subjects are presented in interesting editorial style. Electrical Times is an important part of Edison's carefully planned promotion program, designed to aid and assist appliance dealers.

3-38

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), March, 1938, Vol. 80, No. 3. Published monthly by the McGraw-Hill Company of California, 883 Mission St., San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shilling). Single copy, 25c.
Copyright, 1938. McGraw-Hill Company of California.

The All-Industry Magazine of Progress

ELECTRICAL WEST

MEMBER AUDIT BUREAU OF CIRCULATIONS

ESTABLISHED 1887 AND INCORPORATING THE "ELECTRICAL JOURNAL," "JOURNAL OF ELECTRICITY, POWER & GAS" AND "JOURNAL OF ELECTRICITY"

McGRAW-HILL COMPANY OF CALIFORNIA
883 Mission Street, San Francisco

James H. McGraw
Chairman of the Board
George C. Tenney, Vice-President

R. A. Balzari, President
Roy N. Phelan
Secretary and Treasurer

CONTENTS FOR MARCH, 1938 — VOL. 80, NO. 3

Electra's Husband		23
How You Can Use the P.C.E.A.	Raymond M. Alvord	24
Rural Loadbuilding		
Submersible Pumps	Miles C. Smith	26
Lighting & Wiring		
Stanford Theater		28
Maintenance		
Seeing Ability	Samuel G. Hibben	32
Bonneville—A Record in Pictures		33
The Dam the Army Built		34
Construction		36
Completion		38
Turbines		40
Generators		41
Power House		42
Switchgear & Transformers		44
Governors		46
Station Power & Miscellaneous		47
Personnel		48
Sales Parade		57
Appliance Sales Guide—Electric Ranges		65
Editorial		70
Associations		72
News of the Industry		73
Where to Buy in the West		90

George C. Tenney, Editor
Wayne Snowden, Engineering Editor
Roy N. Phelan, Manager

W. A. Cyr, Associate Editor
Stanley Schuler, Assistant Editor
Hans Hjorth, Typography

Editorial Advisory Board—

UTILITIES: R. E. Fisher, Vice-President in Charge of Public Relations and Sales, Pacific Gas and Electric Company, San Francisco; J. A. Hale, Vice-President, Utah Power & Light Company, Salt Lake City; Glenn L. Jackson, Vice-President and Commercial Manager, The California Oregon Power Company, Medford; Frank McLaughlin, President, Puget Sound Power & Light Co., Seattle; L. T. Merwin, President, Northwestern Electric Company, Portland; W. C. Mullendore, Executive Vice-President, Southern California Edison Company, Ltd., Los Angeles . . . MANUFACTURERS: Vernon Brown, Vice-President, Square D Company, Los Angeles; W. R. Marshall, Vice-President, Westinghouse Electric & Mfg. Co., San Francisco; A. S. Moody, Northwest Manager, General Electric Company, Portland . . . WHOLESALERS: J. I. Colwell, Northwest Manager, Graybar Electric Co., Inc., Seattle; N. W. Graham, Graham-Reynolds Electric Co., Los Angeles . . . CONTRACTORS: Lloyd Flatland, Globe Electric Works, San Francisco; S. G. Hepler, Arrow Electric Co., Seattle . . . DEALERS: H. H. Courtright, President, Valley Electrical Supply Company, Fresno; J. C. Chamberlain, Secretary-Manager, Bureau of Radio and Electrical Appliances, San Diego.

TALE OF ICHABOD

ICHABOD was a nice, meek little man who had a nice, meek little income and a nice, meek little wife. Ichabod loved his wife very much, so one happy day he went down to the store and bought an electric range. "I'll pay for it on time," Ichabod said, and the dealer was sure Ichabod would keep his word ✍ For a long time Ichabod did keep his word. Then Mrs. Ichabod went to a great big literary tea. It was a lovely tea, but instead of talking about books Mrs. Ichabod's friends talked about gas ranges—so much that Mrs. Ichabod, convinced that it was a gas range she wanted, went home and made Ichabod stop payments on the shiny electric range. ✍ Now it happened that this same thing had been going on all over town and the dealer didn't like it. So he hailed Ichabod into court and put him on the stand ✍ The judge of this court was a very stern man and when he asked Ichabod why he had stopped payments on the range he frowned horribly ✍ Ichabod was scared. "We couldn't afford it, your honor," he said. "We could cook cheaper with gas." ✍ "What?" said the judge ✍ "We could save money by using gas," Ichabod said ✍ The judge looked very, very severe. "Ichabod," he said, " I cannot call you a liar because that wouldn't be proper. But you are very wrong. I have had three electric ranges and they cook better and cheaper than anything else. I judge you guilty." ✍ Now the moral of this story is obvious: Even very stern judges know the world is moving toward electrical living. But the question is this—are you giving judges a chance to show off that knowledge? In other words, are you selling all the ranges and refrigerators and washers your immediate market demands? ✍ If you aren't, there is one readily available solution—the Sales Parade and Appliance Sales Guide appearing monthly in ELECTRICAL WEST ✍ These sections give you in concise, easy-reading form stories of how Jones' Appliance Shop sold ranges; stories of what your local utility is planning to do to help you sell ranges, and the sales-making answers to your prospect's objections ✍ ELECTRICAL WEST is your guide to a more profitable business.

NEW FANS! NEW PLANS!

Here is the big fan news of 1938 . . . the amazing new General Electric Super-Quiet Fans, equipped with revolutionary, new G-E Vortalex Blades!

These blades provide greater air movement and quieter operation —because they are scientifically shaped and pitched so that every bit of blade surface works with maximum efficiency! And they are an exclusive G-E development!

Tie in with G-E FANS for 1938 and participate in the profits that General Electric Fan Dealers will enjoy! You'll have four lines of fans—Super-Quiet, Quiet, Standard and Junior—a line to meet every demand—and brilliant new sales and advertising helps featuring a brand new "HOT WEATHER NERVES" consumer approach!

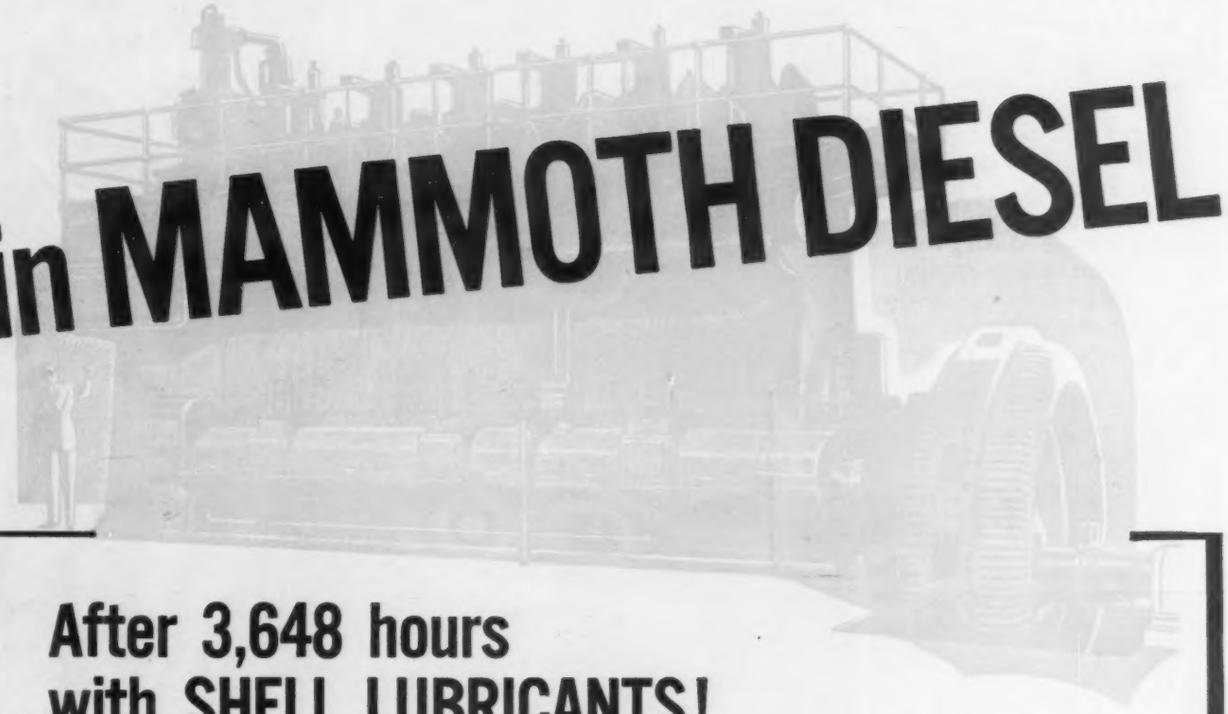
Ask your General Electric Fan Distributor's Salesman for complete details. You'll profit by it!

THE NEW 1938 G-E FAN PORTFOLIO

Contains complete details concerning General Electric's new fans and new plans for 1938. The salesman of your local G-E Fan Distributor has a copy. Ask to see it! Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn.

GENERAL ELECTRIC

Only .002" cylinder wear in MAMMOTH DIESEL



After 3,648 hours with SHELL LUBRICANTS!

IN 1935, the Carthage, Missouri, Water and Electric Plant found that its three Diesel engines no longer had sufficient generating capacity to meet the city's growing requirements for light and power. They went to the Nordberg Manufacturing Company with their problem.

As a result, the Board of Public Works of the City of Carthage contracted with Nordberg for one of their new model 2,250-horsepower TS-216's then being developed and tested in the Milwaukee factory.

With the first development of this enormous new Diesel, Shell engineers closely analyzed its lubrication requirements—called on Shell's wide resources and experience to find the ideal lubricant. Exhaustive block tests proved the exceptional performance of Shell Talpa Lubricating Oils. The new Diesel engine was placed in operation in Carthage, its pistons cooled, its bearings and cylinders lubricated by Shell products—100%.

For 3,648 hours this new Diesel engine ran continuously at the Carthage plant. Then the big engine was stopped and its pistons were pulled for inspection.

All oil rings and ring grooves were found to be mechanically free and without a trace of deposits. Most remarkable, after 3,648 hours of operation, cylinder wear was found to be less than .002 of an inch—almost unheard of in an engine of this size!

* * *

This "success story" of a great Diesel engine and a great lubricant is important to you. For it is a story that is being repeated day after day in mills, mines and factories all over the United States. Shell brings to your problem a "plus" in lubrication: The finest lubricants being refined today, plus resourcefulness born of practical experience. To avail yourself of this service, write or phone your nearest Shell office.

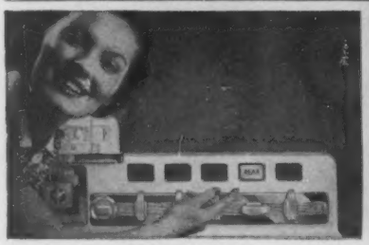
SHELL INDUSTRIAL LUBRICANTS

SHELL

HERE'S TODAY'S COMPLETELY MODERN ELECTRIC RANGE!

This NEW 1938 General Electric range is *completely* modern—with many exclusive General Electric features. It's new in brilliantly beautiful styling! New in automatic features! New in economy features! New in downright dollar-for-dollar value! And it will give a big boost to electric cookery.

WOMEN WILL WANT THESE 3 Thrifty Features



1 TEL-A-COOK LIGHTS. Instantly inform when and where the current is on, and indicate the degree of heat being applied. This signal saves current by visible warning if switch is carelessly left on. A new and exclusive G-E feature.

2 SELECT-A-SPEED Calrod Cooking Unit. Five cooking heats from one unit, with one switch! Hi-Speed, Half-Speed, Quarter-Speed for normal needs; Thrift-Speed for simmering; and for keeping food warm, a low Warm-Speed.

3 TRIPL-OVEN. Three-ovens-in-one. Small Speed Oven for single-shelf cooking; pre-heats faster and greatly decreases amount of current used. Master Oven of extra large capacity. Super-Broiler with greater flexibility in speed and capacity.

ONE OF SIX NEW 1938 G-E MODELS

THE spectacular 1938 G-E Chancellor Range shown above is NEWS. Bigger NEWS is the announcement of five other brand new General Electric models of advanced design and appointments. Many of the following features will be found in all new models:

Tel-A-Cook Lights. Select-A-Speed Calrod Cooking Unit. Tripl-Oven. Porcelain Unitop. No-Stain Vent and Oven Moisture Control. Adjustable Non-Tip Sliding Shelves. Automatic Interior Oven Light. Automatic Oven Timer. Built-In Minute Minder Chime. Generous Sized Thrift Cooker. Electrically Welded Steel Bodies. Large Storage and Warming Compartment.

Models and prices for practically all income groups—cracking good sales promotion and national advertising support—liberal finance plans—plus public confidence in the General Electric name—round out a range sales opportunity you should investigate! Get aboard the Mainline and go places with General Electric in 1938! See the General Electric distributor *today*.

General Electric Company, Specialty Appliance Division, Nela Park, Cleveland, Ohio

G-E Refrigerators, Ranges, Electric Sink with Dishwasher and Disposall, Water Heaters, Washers, Ironers, also "Packaged" Commercial Refrigeration Products.

THE COMPLETE LINE OF ELECTRICAL HOME APPLIANCES—every one proved by performance, tested by time. Backed by 60 years of electrical manufacturing experience. "Go-to-Town" on the Mainline in 1938! It's *another* G-E year.

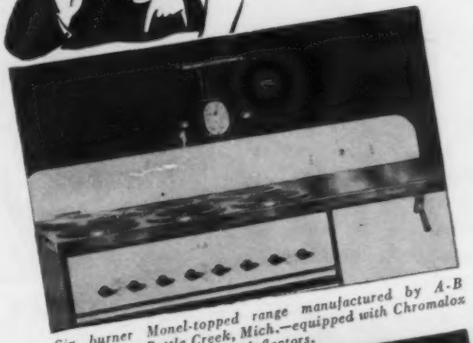
GENERAL ELECTRIC

The Whole Trade's SELLING...

The Rittenhouse Quality No. BE-16 Monel-topped range manufactured by Roberts and Mander Stove Co., Philadelphia — equipped with Chromalox units and Ebonized Monel deflectors.

Estate Monel-topped range, manufactured by Estate Stove Co., Hamilton, Ohio—equipped with Chromalox units and Ebonized Monel deflectors.

EBONIZED MONEL



Six burner Monel-topped range manufactured by A-B Stoves, Inc., Battle Creek, Mich.—equipped with Chromalox units and Ebonized Monel deflectors.

Crawford Monel-topped range manufactured by Walker & Pratt Co., Boston—equipped with Chromalox units and Ebonized Monel deflectors.

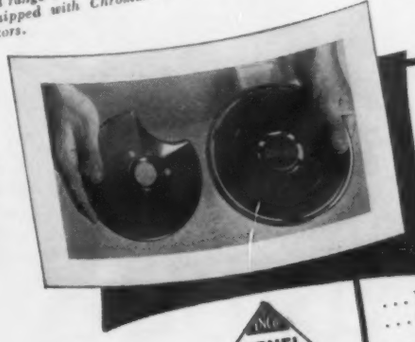
... Newly developed metal provides additional sales argument for many well-known makes of ranges.

Fast, dependable cooking at low cost—a powerful sales argument for any range, as you know from experience. And now, to many popular ranges the famous Chromalox Super-Speed Units bring an important additional selling point—new deflectors made of Ebonized Monel.*

Completely out of sight, yet right at your finger tips, is a small, black piece of metal no bigger than a saucer pan that gives you a wonderful opportunity for effective demonstration. Lift the Chromalox unit out of the range and show your prospect the removable deflector beneath. Remove this deflector—it's just a matter of seconds—and show how it's formed out of Ebonized Monel. Your prospect will see, instantly, the advantage of this black, shiny metal. No chips, no rust. And heat will never discolor it. It's black already—with a tight oxide coating attached as permanently to the metal as ink to paper.

Known and preferred by millions of housewives, lastingly lustrous Monel adds the finishing touch to quality ranges of every well-known make. And the new, shiny-black Ebonized Monel adds the finishing touch to the famous Chromalox Super-Speed range units: durability and convenience of Chromalox units. So be sure to point out the For deflectors of Ebonized Monel are now standard on these popular heating elements. Write for further information.

THE INTERNATIONAL NICKEL CO., INC.
67 WALL STREET NEW YORK, N. Y.



INSIDE STORY: Here's the hidden part that interests practical housewives. It proves to them that the ranges shown above are not simply dressed up for looks—but equipped for *work!* This little pan, no bigger than a saucer, is easy to remove from the Chromalox unit and show to your prospects. Made of Ebonized Monel, it is chip-proof, crack-proof, rust-proof and non-discoloring. Chromalox Super-Speed units equipped with Ebonized Monel deflectors are available on all of these ranges: A-B Stove . . . Crawford . . . Electromaster . . . Estate . . . Frigidaire . . . Kelvinator . . . Marion . . . Monarch . . . Norge . . . Quality . . . Universal.

INCO MONEL

*Monel is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. This alloy is mined, smelted, refined, rolled and marketed solely by International Nickel.

We serve

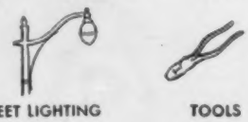
the whole community

THE hustling center of business downtown . . . busy factories along the railroad . . . cozy homes on the outskirts . . . *the whole community* . . . is served by Graybar's distribution of electrical supplies.

Pole lines to carry electric light and power over the countryside . . . street lights and Public Safety equipment for the city . . . motors for industry . . . appliances for the home . . . and wiring materials for every building or maintenance need . . . all these are made readily available from Graybar.

Graybar's list of 60,000 electrical items amply meets *every* electrical need. Graybar's system of nearby warehouses brings you *what* you want . . . *where* you want it . . . *when* you want it. And Graybar's reputation since 1869 is your assurance of reliability.

GraybaR



OFFICES IN 85 PRINCIPAL CITIES . . . EXECUTIVE OFFICES: GRAYBAR BLDG., NEW YORK

Announcing 2 NEW MONEY MAKING Monarch Ranges

THE DE LUXE COMBINATION ROOM HEATER AND ELECTRIC RANGE

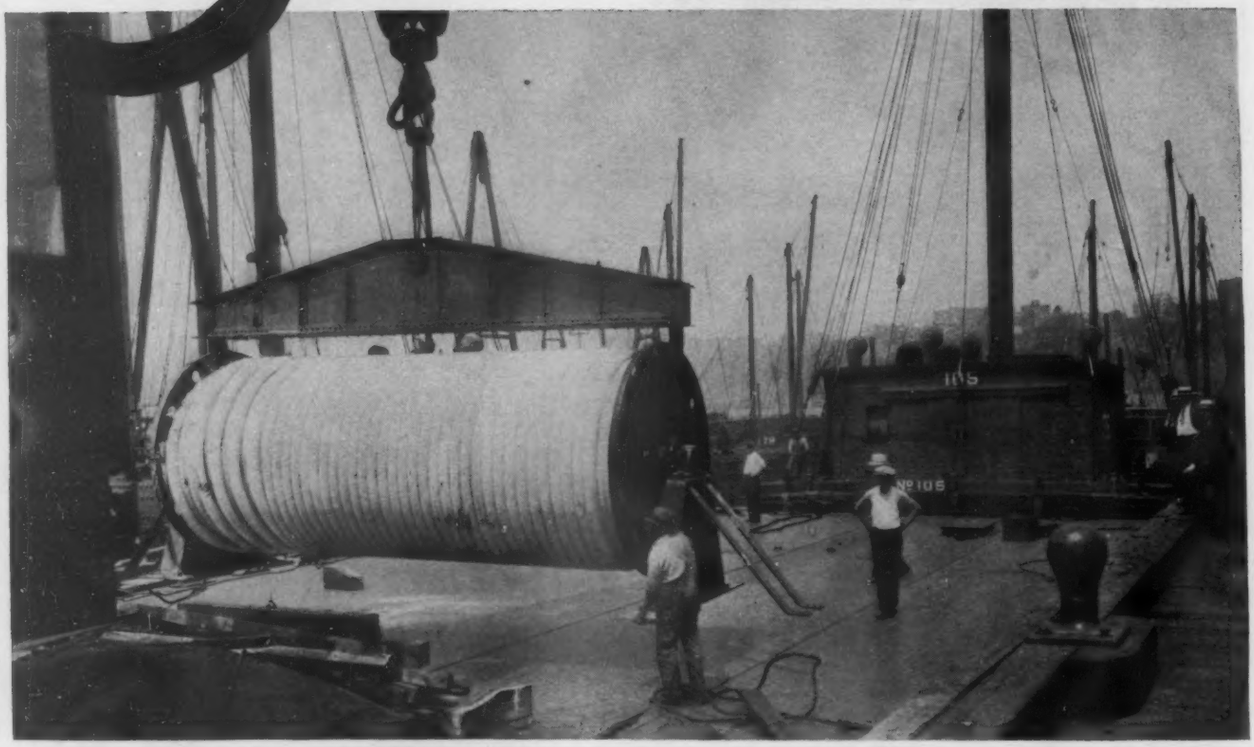
An electric range, as well as a coal and wood heater, are combined in this beautiful new Monarch. The efficient room heater can also be used as a refuse burner. A hot water front can be installed. DeLuxe equipment includes a large oven, four high efficiency units, cabinet style and three-heat switches for high speed. low speed and simmer, insure economy

The DeLuxe FR86LW Patented Roaster Range. Now Monarch offers the fast selling roaster feature in a deluxe range that fills the needs of your most exacting customer. It is equipped with a large oven, as well as the roaster built in the top. Two ovens are optional. Flush back, cabinet type design and high efficiency Monarch units are among the many exclusive Monarch features. Write today for literature, photographs and prices.

MALLEABLE IRON RANGE COMPANY
33 N. Lake Street, Beaver Dam, Wisconsin

GO MODERN WITH A MONARCH

Submarine POWER CABLES



The Obvious Need of *RELIABILITY*

CONFIDENCE must be placed in submarine power cables. Inaccessible to repairs, carrying important loads, these under-water cables must give faithful performance over long periods of time . . . Okonite rubber insulated and Okonite-Callender paper insulated submarine cables made for all voltages, embody the results of long experience and carefully developed technique. We are glad to be consulted on *any* cable problems.

THE OKONITE-CALLENDER CABLE CO., INC.

AN AFFILIATE OF THE OKONITE CO.
EXECUTIVE OFFICE: PASSAIC, NEW JERSEY

Why Westinghouse Home-proved

WATER HEATERS SELL EASIER

1 From homes like this comes convincing proof of Real Hot Water Service — *easy, quick, cheap* — just like electric light!

2

Proving Home Hostesses like this furnish Home-proved facts that convince your prospects, make selling easier.

3 Built on Home-proved facts, powerful selling helps and sales training materials like this really SELL WATER HEATERS.

4

Colorful, compelling window displays like this flag the passing crowd, bring interested prospects into your store.

5 Local Proving Homes of your own give you new prospects, free publicity, added sales-power, MORE PROFITS! This book shows you how.

SWING AHEAD WITH WESTINGHOUSE IN 1938!

Let Westinghouse help you win valuable cash prizes in the Modern Kitchen Bureau's nationwide program. Call your nearest Westinghouse man, or write Dep't. 8175, Westinghouse Electric & Mfg. Co., Mansfield, Ohio

Westinghouse *Home-proved* Water Heaters

EVERY HOUSE NEEDS WESTINGHOUSE

THE SATURDAY EVENING POST
Studying made easy! I. E. S. Better Sight Study Lamps, equipped with 150 or 100-watt G-E Bulbs, certainly do help take the strain out of school work. Every student should own one.
After the day's work, what a relief to relax with the evening paper under the ample glareless light of this I. E. S. Better Sight Bridge lamp, equipped with a 150 or 100-watt G-E Bulb.
I. E. S. BETTER SIGHT LAMPS can be identified by the certification tag shown above. Look for it wherever you buy a lamp. It is your assurance of Better Light for Better Sight.
"Read me a story, Mother!" It's always a pleasant task under the generous diffused light of this Three-light I. E. S. Better Sight Lamp, that uses one of the new MAZDA Three-lite lamp bulbs.
HERE'S Better Light-Better Sight
FOR ALL THE FAMILY
The I. E. S. Better Sight Lamp idea was born to meet the need of children and young people in our schools and colleges. Modern education puts heavy burdens on young eyes . . . and these new and better lamps are a genuine advance in reading comfort. Today you see I. E. S. Better Sight Lamps everywhere. The handsome Three-Light lamps give three convenient levels of light for the living room. Many attractive bridge lamps, too, are now bearing the I. E. S. Approval Tag. Dainty end table I. E. S. models light each end of the modern sofa. Truly, Better Light-Better Sight has come for every member of the family!
General Electric does not make I. E. S. Better Sight Lamps but is glad to publish this in the interest of Better Sight.
BE SURE to equip your I. E. S. lamps with the proper size MAZDA lamps made by General Electric. They are brighter than ever this year. The bulb above is a 100-200-300 watt MAZDA Three-Lite lamp and costs only 65¢
OTHER SIGHT-SAVING SIZES:
50-100-150 WATT THREE-LITE . . . . . 50¢
150 WATT . . . . . 25¢
75 OR 100 WATT . . . . . 20¢
Smaller sizes 15-25-40-60 WATTS . . . . . 15¢
GENERAL ELECTRIC

This full page advertisement appears in the Feb. 12th issue of the Saturday Evening Post *reaching more than three million families.*

3,000,000 FAMILIES SAW THIS AD IN THE SATURDAY EVENING POST

The full page advertisement above appeared in the February 12th issue of the *Saturday Evening Post.* Its Better Light-Better Sight message reached more than 3,000,000 families who regularly read that magazine.

By actively sponsoring the increased sale and use of I.E.S. Better Sight Lamps through consistent magazine advertising of this kind, General Electric is helping utilities promote better light for better seeing.

Reprints of ads like the one shown, as well as newspaper ads *(in mat form)* adapted from these ads and designed for utilities' own use, are available at low cost. For complete information, see your nearest General Electric lamp division office or write to General Electric Co., Dept. 166-W, Nela Park, Cleveland, O.

• • •

General Electric does not make I.E.S. Better Sight Lamps but is glad to publish this in the interest of better sight.

GENERAL ELECTRIC

The swing is toward

5/8% HALF-CYCLING STEPS

Because . . . they give smoother regulation at low maintenance cost.

Smooth regulation of primary feeders pays a good return on your voltage regulator investment in terms of increased load and customer satisfaction. The smaller the size of step, the closer the voltage can be regulated—the smaller the voltage and kva to be interrupted. Hence, you have better contact performance—smoother operation, and less maintenance trouble and expense. For these advantages, and many other reasons, well informed engineers favor 5/8% Half-Cycling Step Regulators over other types.

The AFR is the original automatic 5/8% Step Half-Cycling Feeder Voltage Regulator. It has dependably and smoothly regulated feeder voltage for four years on all types of power systems from coast to coast. Its performance record and low cost maintenance record speak for themselves. It can do the same for you.

● *Increase Your Revenue* with Allis-Chalmers 5/8% Half-Cycling Step Regulators.

Write Allis-Chalmers AFR into your feeder regulator specification and get the utmost in performance and satisfaction for your investment.

Engineering Bulletin 1170B explains in detail the money-saving advantages of 5/8% Half-Cycling Steps in automatic feeder regulation—36 illustrated pages of sound Feeder Voltage Regulator information. Write for your copy.

858

TRANSFORMER DIVISION

ALLIS-CHALMERS

MILWAUKEE · WISCONSIN

HERE'S YOUR ALL-STAR SELLING OPPORTUNITY OF '38

HOTPOINT'S NEW 1938 ELECTRIC with SELECT-A-SPEED

3 NEW LINES 10 NEW MODELS

APPROVED AND IMPROVED PROFIT-BUILDING SALES FEATURES

Here's the Range that has *everything!* Sensational new Select-A-Speed Calrod..Oversized Directional Heat oven with 4-Heat Switch..Thrift Cooker..combined Timer Clock and Time Chime..choice of beautiful colored hardware—an almost endless variety of sales features to win customers—build profits for you in '38. Don't delay. See the new Hotpoint line today.

Style and Beauty in Matched Design . . .
Greatest Electric Range Values in Hotpoint History

ROYAL—Supreme style and beauty for the modern kitchen, plus a wealth of advanced Hotpoint features and improvements. Three superb models in gleaming white porcelain enamel. Extra-large cooking capacity. Large space for storage. Choice of Plaskon or Crystal hardware. The finest ranges you can buy. Illustrated, above, is The Embassy. RD2.

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc., 5612 W. Taylor Street, Chicago, Ill.

JUST A FEW OF THE *All-Star* FEATURES

Directional Heat Oven—A single switch regulates top and bottom oven heat. Gives more accurate control.

Removable Pans—Stainless steel; in two sections, easily removable. To clean, just slide the two sections out.

OVERSIZE 6 Quart Thrift Cooker—Cooks a small quantity of food or an entire meal at amazingly low cost.

Oven Timer Clocks—With built-in 30-minute Time-Chime, for timing all oven and surface cooking operations.

Colored Hardware—Choice of Chinese red, Delphinium blue or Apple green to harmonize with kitchen.

RANGES CALROD . . .

Intense High Speed WITH NEW *Economy*

5 COOKING SPEEDS . . . make the new 1300 watt Select-A-Speed Calrod the fastest, most accurate and flexible electric cooking unit in the world. [1] Speed (1300 watts) [2] Half (650 watts) [3] Quarter (325 watts) [4] Thrift (160 watts) [5] Warm (80 watts) on 115/230 volts. Gives you the greatest economy story ever told on electric cookery. Actually produces 20% to 64% savings of electric current in many cooking operations—brings 8% more speed than 1200 watt Hi-Speed Calrod unit.

★ DE LUXE ★

DE LUXE—Hotpoint's modern 4-model De Luxe line, offering a variety of choice to meet every need. Sturdy Hotpoint construction and smart, streamlined styling, with Select-A-Speed Calrod, Thrift Cooker, oversize Select-A-Heat ovens, high speed broiler, many other sales-compelling advancements. Outstanding values. Illustrated, above, is The Salisbury. RC4.

★ STANDARD ★

STANDARD—Three beautiful models offering the greatest electric range values ever made available. Striking beauty of design is matched only by the many outstanding convenience features for every type of cooking operation. Only Hotpoint offers sensational electric range values like these for volume sales. Illustrated, above, is The Highlander. RB1.

Hotpoint

ELECTRIC RANGES

REFRIGERATORS • ELECTRIC WATER HEATERS
DISHWASHER-SINKS • WASHERS AND IRONERS

USE THESE HOTPOINT SALES HELPS—New newspaper ads, direct-mail, sound-slide films, outdoor posters, floor and home demonstration material—everything to help you sell. See your Hotpoint representative.

JUST OUT! THE WINNING SELLING THEME FOR 1938!

FRIGIDAIRE WITH NEW SILENT METER-MISER

Saves More on Current, Food, Ice, Upkeep!

FRIGIDAIRE DEALERS ARE NOW HOLDING COLORFUL SPRING SHOWINGS OF THE NEW FRIGIDAIRE WITH NEW SILENT METER-MISER, DRAMATIZING THE MANY TIME AND MONEY-SAVING FEATURES THAT HAVE ALREADY WON THE APPROVAL OF THE BUYING PUBLIC EVERYWHERE

SAVE ALL 4 WAYS

or You May Not Save at All!

● This powerful selling theme spearheads Frigidaire's 1938 sales attack. It's based on a 4-way savings demonstration that gives buyers undeniable refrigeration facts, and proof before their eyes, before they buy! Proof that Frigidaire with the new Silent Meter-Miser is the greatest money-saver in Frigidaire history. Proof that it saves more in every way there is to save!

Yes, some refrigerators may save in one, two, or even three ways, but Frigidaire Dealers will show that unless the prospect saves *in all 4 ways* she may not save at all! What a convincing selling demonstration!

Built into this aggressive new campaign is the tremendous power of more extensive and intensive advertising, new, exclusive features, and great new sales aids. It will win for Frigidaire Dealers continued sales leadership in 1938!

Frigidaire Division, General Motors Sales Corporation, Dayton, Ohio.

Frigidaire's National Advertising Starts February 15th in these publications:

The Saturday Evening Post	Collier's	Better Homes & Gardens
Ladies' Home Journal	Liberty	Holland's
Woman's Home Companion	Life	Household
Good Housekeeping	McCall's	Woman's World
American Magazine	True Story	Graduate Group
American Home	Cosmopolitan	Electricity on the Farm

Plus hundreds of the country's leading newspapers . . . thousands of colorful billboards

GM FRIGIDAIRE MADE ONLY BY GENERAL MOTORS

This Square D Multi-breakeR installed in the kitchen protects the circuits on the first and second floors.

50,000 People Inspected This Model Home . . . and its SQUARE D MULTI-BREAKER Equipment!

● The Square D Multi-breakeRs in this model home were the conveniences which attracted the most attention and received the most favorable comment by the thousands of people who inspected it during the thirty days it was on exhibit.

These people were particularly interested in the fact that the Square D Multi-breakeR automatically disconnects any overloaded circuit and that no replacement parts are necessary to restore service.

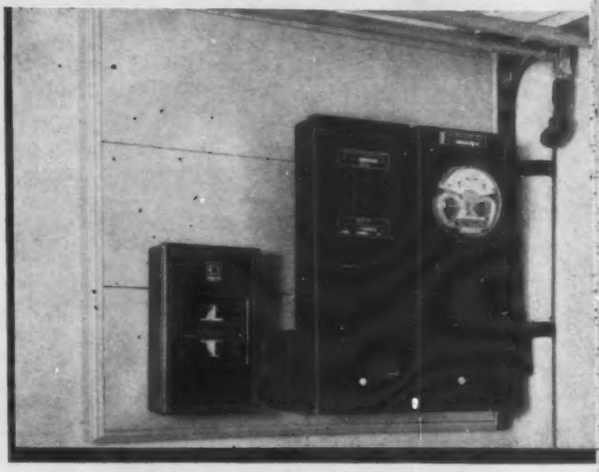
This particular home is equipped with two Square D Multi-breakeRs. One in the wall of the kitchen which protects the circuits on the first and second floors; the other, in the basement, for the protection of the basement circuits.

It's easy to sell the Square D Multi-breakeR. Advertising and publicity have made home builders aware of this modern convenience. To show it is to sell it.

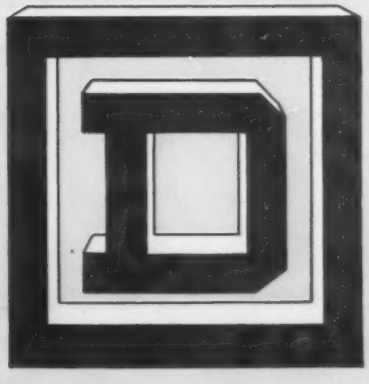
If specifications call for fusible equipment, quote the owner both ways—fusible equipment and Square D Multi-breakeRs. You'll be surprised how often you will sell a complete Square D Multi-breakeR installation and a more profitable wiring job.

Square D electrical equipment is available through the better electrical wholesalers everywhere.

CALL IN A SQUARE D MAN



This Square D Multi-breakeR is installed in the basement and protects the basement circuits.



SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

Recording Demand Meters Proved in Principle...

IMPROVED IN DESIGN

NEW FEATURES

ACCURACY
The watthour meter elements have the same high accuracy and excellent performance characteristics of the type C-2 watthour meter.

CHART DRIVE
A new chain and sprocket re-roll drive with a spring clutch assures correct advancing of the chart independent of atmospheric conditions.

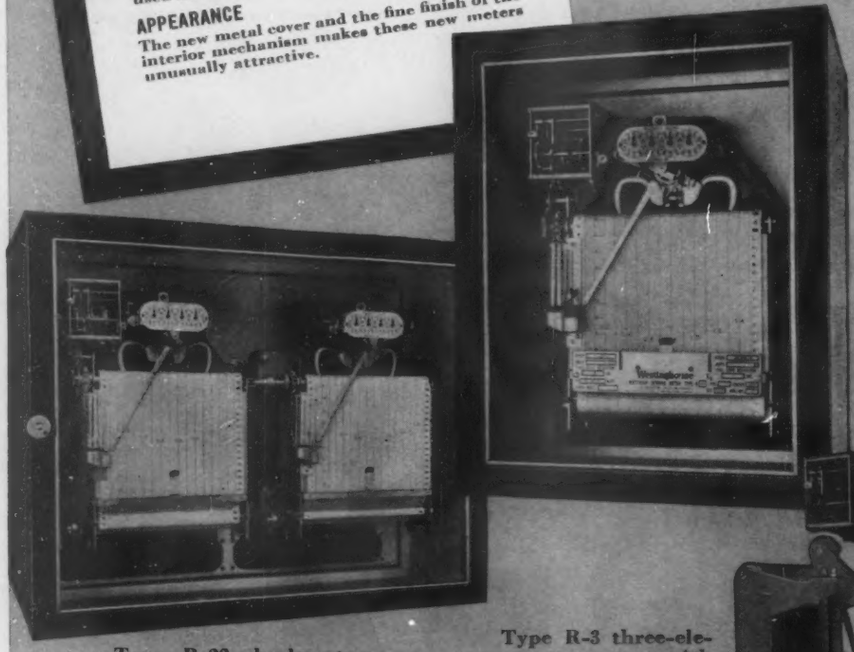
INKING
An improved mechanism permits the use of fast drying ink, producing neat, legible charts under adverse atmospheric conditions.

CLOCK AND REGISTER
The clock and register mechanisms are rugged and simplified, assuring reliable operation. The Westinghouse RW synchronous motor is used in the clock.

APPEARANCE
The new metal cover and the fine finish of the interior mechanism makes these new meters unusually attractive.

● These new Westinghouse Recording Demand Meters provide exceptional simplicity, accuracy, and reliability. Westinghouse was the builder of the first strip-chart recording demand meter. In these new meters, which are based on a tried and proved principle, is incorporated the benefit of more than twenty years' experience.

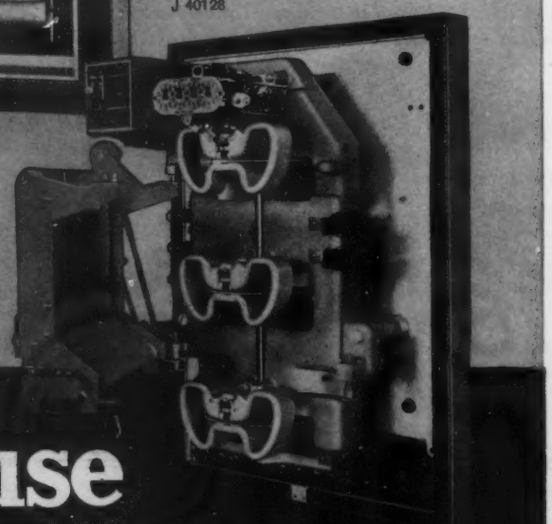
The meters are made in all conventional ratings for all circuits. The dials integrate the kilowatt hours consumed; the charts provide a monthly record of the demand—accurate and easily read. Write for Catalog Section 42-413, Westinghouse Electric and Manufacturing Company, Department 7-N, East Pittsburgh, Pennsylvania.



Type R-2 two-element recording demand meter, hinged cover.

J 40128

Type R-22 duplex two-element recording demand meter.



Type R-3 three-element meter with chart mechanism swung to one side.

Westinghouse

Transformers need not Fail!

CSP Transformer—tank mounted "Deion" gaps.

Start a new page in your records. Service interruptions due to transformer burnouts and fuse outages need not occur.

Operating experience behind the thousands of Westinghouse CSP transformers now in service definitely *proves* that most of the failures and fuse outages due to lightning, short circuits and overloads *can be eliminated!* The result is substantial improvement in service continuity and customer good will, coupled with a new low mark in operating costs. Ask your Westinghouse representative today for complete information or send for Booklet 2042-A. Westinghouse Electric & Manufacturing Company, Department 7-N, East Pittsburgh, Pa.

ONLY C·S·P TRANSFORMERS ARE:

1. Completely Self Protected against lightning — no fuses to replace.
2. Completely Self Protected against burnouts from short circuits.
3. Completely Self Protected against burnouts from overloads.

PLUS

4. Simple, low-cost installation; maintenance expense low after installation.

C·S·P

I-70121

Westinghouse

Completely SELF PROTECTING TRANSFORMERS

The Jobs you READ about
THE ADMINISTRATION BUILDING
TRIANGLE PRODUCTS exclusively
in the FIRST building of the
NEW YORK WORLD'S FAIR 1939
FIRST TO LAST . .
Triangle products Reward Buyers!
TRIANGLE CONDUIT & CABLE CO., Inc.
Horace Harding & Queens Blvds.
ELMHURST, NEW YORK CITY, N.Y.
PACIFIC COAST DIVISION
C. C. Hillis, Vice-President in Charge of Sales
390 Seventh St., San Francisco, California
NEXT ISSUE
Metro-Goldwyn-Mayer
Production Studio
ARTERIES FOR ELECTRICAL SYSTEMS INCORPORATED
It MUST be right!

YOUR BIG OPPORTUNITY TO BUILD STREET-LIGHTING LOAD

Light The Traffic Arteries First

IS your community aware of the fact that improperly lighted main traffic arteries are TEN TIMES MORE DANGEROUS AT NIGHT THAN DURING THE DAY? These streets must be lighted immediately to stop these nightly traffic fatalities. Public officials will welcome your suggestion of improved lighting on their most dangerous thoroughfares as a prompt method of preventing these night accidents.

The relighting of dangerous thoroughfares has become an opportunity and an obligation. To help you do your part—to help you prove the value of adequate lighting—we have prepared an attractive direct-mail program which we shall be glad to mail to public officials on your lists, or which you can mail to them. Your G-E lighting specialist will furnish you with details concerning this program. General Electric, Schenectady, N. Y.

GENERAL ELECTRIC

500-251

Offer

NEW Solutions to Insulated-cable Problems

PRODUCTS of extensive research have made possible these exclusive G-E cables. One such product is the amazingly fast organic accelerator used in the vulcanization of Versatol Performite and of tellurium-rubber compounds. Another is the base of the varnish used for Glyptal cloth. Still another is the base of Flamenol.

As a result of this development work, you can give more effective thought to the satisfactory solution of such problems as oils, acids, alkalies, heat, flame, moisture, corona, and other agents that attack cable.

Learn the real worth of these four G-E cable designs and see if they can work for you as satisfactorily as they have for many other users. A G-E cable specialist will be glad to help. Address the nearest G-E sales office, or General Electric, Schenectady, N.Y.

GLYPTAL CLOTH

Three-conductor, interlocked armor—for general-purpose wiring in industrial plants. Offers the advantage of metal-enclosed circuits which can stand high ambient temperatures, overloads, and oil. Easily installed with standard conduit fittings; results in over-all savings.

Glyptal cloth braided—for general-purpose industrial-motor wiring; for rewiring mining and industrial locomotives and other apparatus. Braid is moisture-resisting as well as flame-resisting. Cable can stand up under *heat, oil, acids,* and mechanical abuse. Has proved ideal for this service.

VERSATOL PERFORMITE

A rubber insulation that combines all three most desirable properties: high operating temperature—75 C; low moisture-absorption factor—0.01 gram per sq in.; and superaging—504 hours in oxygen bomb.

Application: General-purpose wiring of important circuits in industrial plants and for other uses requiring such high-grade rubber-insulated cable.

FLAMENOL

For the wiring of machine tools, panels, for battery leads, for chemical plants, sewage-disposal plants, pickling plants, plating machines, printing machines, and other uses.

Flamenol resists acids, alkalies, oils, water, and flame—will not sustain combustion; has a small diameter and high dielectric strength.

TELLURIUM

A tough, long-life, all-rubber sheath. Used on cable for mining machines, electric shovels and dredges, arc welders, and other portable equipment.

For "parkway" cable and similar uses where the cable is required to withstand mechanical abuse, soil acids, alkalies, and moisture. May be buried in soil, cinders, pulled in conduit, or laid under water.

ALWAYS THE RIGHT TYPE FOR EACH JOB

GENERAL ELECTRIC

Filing No. 1200 520-131

Another New Lustrolier

TO WAKE UP DROWSY SALES

THE NEW
PERMAFLECTOR
LUSTROLIER
N-591

The N-591 Lustrolier is composed of two separate bowls which allow a spill of light over the bottom of the horizontal bowl as shown at the left. The B-591 shown below is one complete bowl and is totally indirect.

A FEW USERS OF PERMAFLECTOR LIGHTING

Apartment Buildings	Food Markets
Art Galleries	Furniture Stores
Automobile Dealers	Furriers
Banks	Gymnasiums
Beauty Shops	Hotels
Churches	Jewelers
Clothing Stores	Museums
Dairy Stores	Newspapers
Department Stores	Office Buildings
Five and Ten Cent Stores	Public Buildings
	Schools
	Stock Exchanges
	Theatres

These people are YOUR prospects.

YOUR lighting prospects demand today, more than ever, an outstanding sales proposition before they will buy. They insist that lighting fixtures be attractive, efficient, and low in price!

The new Permaflector Lustrolier N-591 presents another unusual sales opportunity because it has been well-timed to fit the above needs of present day markets. Your prospects who require decorative beauty will become enthusiastic customers when they see this new unit perform and hear of its low cost.

Offices, restaurants and retail stores are only a few of the many potential buyers of the new Permaflector Lustrolier N-591. This large market means greater volume of sales and increased profits for you.

Write or send the coupon below for complete information on selling and installing the new Permaflector Lustrolier N-591.

PITTSBURGH REFLECTOR CO.

Pittsburgh Pennsylvania — Representatives in 28 Cities

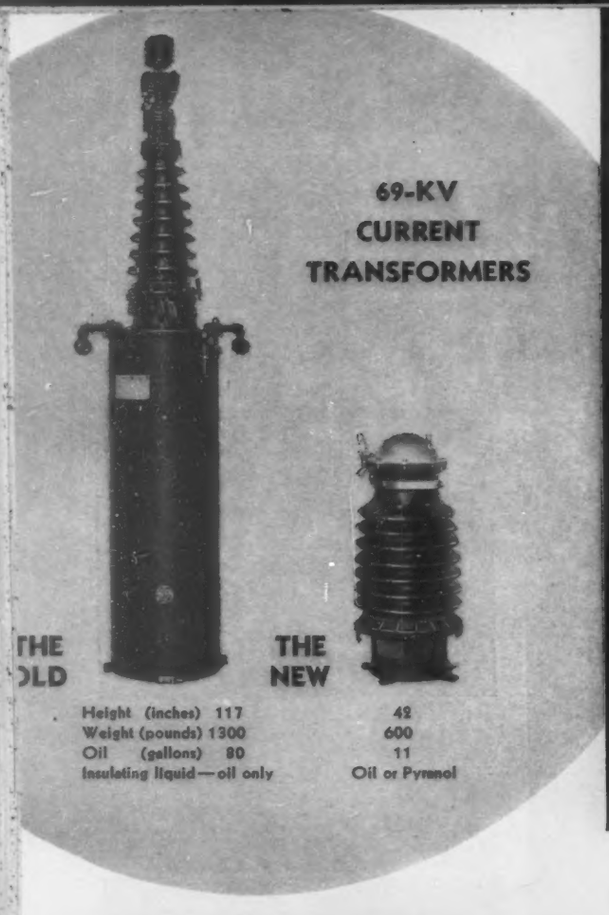
PERMAFLECTOR *Lighting*

PERMAFLECTORS · LUSTROLIERS · LUMINAIRES · SPOTLIGHTS · URNS
FLOODLIGHTS · LAMPS · BUILT-IN CEILING UNITS · ACCESSORIES

PITTSBURGH REFLECTOR COMPANY EW-3-38
OLIVER BLDG., PITTSBURGH, PA.

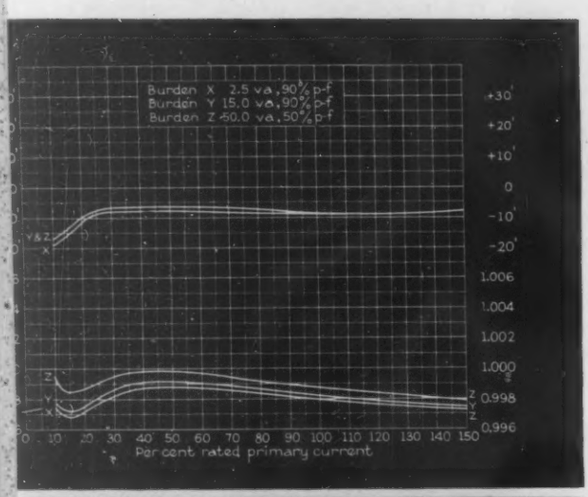
Please send me without obligation your folder entitled "TWO NEW PERMAFLECTOR LUMINAIRES" which gives complete data for sales and installation.

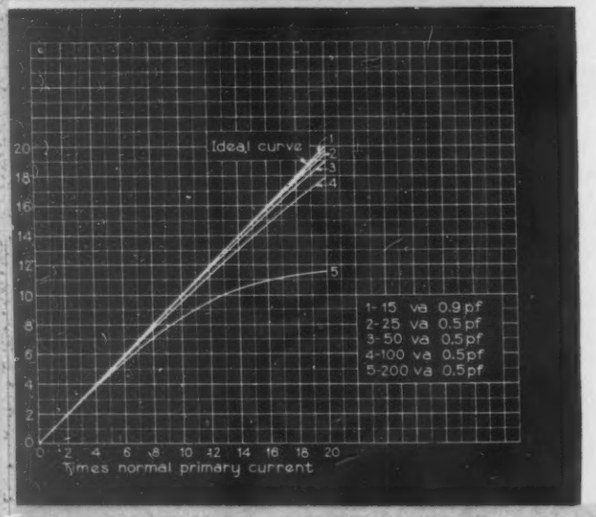
NAME .....
STREET .....
CITY ..... STATE .....



Accuracy MAINTAINED

Size REDUCED MORE THAN 50% in G-E Outdoor Current Transformers





ACCURACY and dependability—they are all-important in outdoor current transformers. With this in mind, G-E engineers have developed a new outdoor current transformer, equally as accurate and dependable as the older-style transformer it will replace, yet only one-half the size. The new transformers, available with either oil or Pyranol, constitute a complete line in the 23- to 161-kv range.

Think what this progress in transformer design means! Reduced handling expense; reduced maintenance cost; greater convenience and economy in installation; conservation of mounting space; and, with Pyranol, a noninflammable, nonexplosive, safer installation—all these benefits are yours with this new-type transformer.

You may ask, "Can accuracy be maintained with such a size reduction?" For the answer, glance at these charts. Notice especially, in the upper chart, the small variation in ratio correction factor, even when the primary current is but 5 per cent rated value. The lower chart shows the accurate retention of ratio characteristics on over-currents. The performance curves shown are those of the 69-kv transformer; they are similar in all respects to the curves of the transformers of other voltage ratings.

We shall be glad to supply additional information on these new transformers. Address the nearest G-E office or General Electric Company, Schenectady, New York.

GENERAL ELECTRIC

Filing No. 6400

420-50

ELECTRA'S HUSBAND

The Sons of Martha Did Toil

"YOUR dinner's late and don't start beefing," was Electra's greeting as I shook the rain from my hat on the night of the big wind and rain last month. "The power went off. It spoiled the cake I was baking. There were no lights. And I missed Bing Crosby's program. Every clock in the house stopped. You're soaking wet! Why didn't you come home in a taxi?"

Just then there was a momentary fluttering of the lights, followed by a brilliant upsurge and then a slow fading, ending in darkness. Outside there was a low rumble of thunder and a distant play of lightning showed through the living room window.

"Light a match or something and then call the power company," Electra snapped. "Maybe they'll listen to you. The line was busy the last time I tried."

"Dear lady, hold your horses. That was probably an oil switch letting loose." Just then the lights came back, weakly, jerkily at first and then finally to full, steady brightness. "And forget about calling the power company. They're doing everything humanly possible to maintain service. Hundreds of men who have worked all day resetting poles, hanging new transformers, clearing away fallen trees, fighting mud and water and exhaustion will probably continue to work all night and maybe even tomorrow so that you and hundreds of thousands like you can have your light and heat and radios and clocks.

"If you read Kipling, you'd get what I mean. Did you ever hear of the Sons of Martha? Well listen to this:

" 'It is their care in all the ages to take the buffet and cushion the shock.

" 'It is their care that the gear engages; it is their care that the switches lock.

" 'Raise ye the stone or cleave the wood to make the path more fair or flat;

" 'Lo, it is black already with the blood some Son of Martha spilled for that!

" 'Not as a ladder from Earth to Heaven, not as a witness to any creed,

" 'But simple service simply given to his own kind in their common need.'

"You can get your last dollar that the Sons of Martha are toiling tonight. And if the subject comes up at your bridge luncheon you might tell some of the complaining ladies of the heroism, sacrifice and suffering of the poor devils who labor and toil without sleep and food to keep your lights burning and your range cooking in emergencies like this."

"HOW would you describe a line crew which worked for 48 hours toiling first through mud and then snow with their truck, finally walking the last half mile with heavy loads of material to build a shoofly around three fallen steel towers? Think of the heartbreaking labor of another crew which for a week has been trying to keep up a line to one of our small northern communities through snow drifts five and six feet deep. A tree falls across the line. They clear it away and splice the wires, only to have a patrolman tell them that four miles back the line is down again. On snowshoes and skis they retrace their steps. Seven days of it, over and over, and the people at the other end just taking their electric service for granted.

"Tell your lady friends about the serviceman who started for a rural substation up in the valley, mired his car and got out to walk. He waded through water up to his knees. Finally it was too deep to proceed. So he turned back. He was too late; the water was rising too rapidly. As a last resort he climbed into a tree in an orchard adjacent to the road. He was perched in the upper branches when he was picked up by a boat the next morning.

"Then there was the power house operator who alone tried to keep flood waters out of his station. The flood was too much for him so he worked to salvage records and such valuable equipment as he could. He completely forgot his own house which was on the same level as the plant. The house went under five feet of water. When the flood subsided, there were three feet of mud in every room, covering furniture, rugs —everything. He lost all his clothes except those which he had on his back."

"My gosh, I haven't any reason to complain when the lights go out," Electra interjected. "But why do the men work like that?"

"They like their jobs. They are imbued with the ideal of service. They are true Sons of Martha."

ELECTRA can't get off the subject of adequate wiring. She has been looking for an apartment for some newcomers from the East. After listening to her caustic remarks about the dumbness and poor salesmanship of every one in the electrical industry connected with wiring, I indulged in a little introspection. I submit that maybe we are clinging too stubbornly to tradition and have refused to give our imagination free play in the consideration of this very important matter.

What would happen if the problem were approached somewhat as follows: We assume a house of six rooms, with the customary halls, closets, porches, baths, garage and yard. How can this property be wired for the greatest convenience of the owner and with the minimum of cost compatible with safety? For the sake of clear thinking we must also assume that there are no codes, rules, ordinances or standard materials. We should start from scratch. How shall we wire this house? What would Edison have done in such a case? What would Kettering do?

In the past we have argued that water service is supplied by pipes. Gas service is supplied by pipes. Ergo, electric service must be supplied by pipes. False reasoning. One of the outstanding characteristics of electricity is that it is flexible. It seems foolish not to take full advantage of this.

Bear in mind, I am not trying to solve this problem all by myself. I am merely suggesting that a solution awaits some new approach, with precedents and traditions thrown to the winds.

HOW *You* CAN USE THE P.C.E.A.

By RAYMOND M. ALVORD

President, Pacific Coast Electrical Assn.

QUESTIONS that have been asked indicate a desire and a need of an explanation of the present set-up of the Pacific Coast Electrical Assn.—how it functions, what the individual member's place in the picture is, when and how committees are appointed and all such details.

Many of our members have been affiliated with the P.C.E.A. for a great many years. Some of them still think of it as it was in the days when the association year was started by the appointment of forty or fifty committees before there was a definite idea of what job, if any, there was for these committees to perform. That has been changed. Today the association functions primarily as an industry forum for the discussion of mutual problems and the exchange of information and experiences. If, out of these discussions it develops that a survey should be made, data collected or a cooperative promotional program undertaken, a committee will then be appointed by the directors for the purpose of performing that particular and specific job. Thus, each P.C.E.A. committee today knows precisely the purpose for which it was appointed and what accomplishments are expected of it; none are, as in the past, faced with the problem of what to do to enable them to turn in a creditable report at the end of the year.

Here is the practical way in which this theory works out: The association is divided into three sections. The Business Development Section has supervision over all commercial activities; the Operating Economics Section covers all technical or engineering activities, and the Administrative Services Section, as its name indicates, covers those fields of activity having to do with the administration of a business, such as accounting, credit, personnel, billing methods, etc. Each of these sections is under the direction of a guidance committee consisting of eleven men selected from all branches of the industry, and from all areas of the association territory. In this way the programs will be so selected that they will best meet the needs of the entire industry. These guidance committees are appointed for the entire year and serve continuously throughout the year. They plan the conclave programs, recommend projects to the directors and supervise the progress of the committees.

Two conclaves are held in the autumn. One is held in San Francisco for the northern California and Nevada members; the other is held in or near Los Angeles for the southern California and Arizona members. The guidance committees arrange programs for these conclaves, setting up discussion groups for whatever problems are of sufficiently general interest and in need of attention. These discussion groups are informal. They are designed to get away from the presentation of lengthy, previously prepared papers and provide an opportunity for a "round-table" discussion of the problems at hand. There is a group leader appointed in order to keep the discussion directed toward the subject, but everyone is expected to participate and contribute his thoughts to the conclusions reached.

Some of the problems that are discussed will find a solution in the combined experiences of those present, or in the thoughts and opinions which are presented during the discussion. On other problems, however, it will develop that there is need of a committee either to gather facts and data for further study or to plan an activity to be conducted as a cooperative promotional program. After the conclaves the leader of each discussion group submits a report to his guidance committee outlining the discussions which have been held and submitting the details of any program which his group felt should be carried on as a committee project.

After both of the conclaves have been held the guidance committees study all the discussion group reports and recommend to the board of directors those projects for which committees should be appointed. Upon approval by the board these committees are appointed and given their assignments. The following spring a conclave is held in Fresno. This is a joint northern-southern meeting at which all the committees submit their findings. Thus, all who are interested have an opportunity to discuss the reports and to incorporate their thoughts into them before they are submitted to the guidance committees and the board of directors.

And, now, how about those members who have valuable ideas to contribute but do not get to a conclave, or whose ideas occur to them between conclaves and call for prompt action to take advantage of some timely opportunity? Are they to be deprived of participation in the industry's progress; is the industry to lose the benefit of their thoughts

The foundation of any industry association is the old saying, "You have an idea and I have an idea; if we get together and exchange them, we are both enriched as we each will then have two ideas." Because of its complicated ramifications, the electrical industry needs centralized all-industry organizations to tie together the specialized branches into a common program of progress and self-education. In describing how the P.C.E.A. benefits the individual President Alvord speaks for the other all-industry associations serving this region.

and suggestions? No, indeed! This new set-up is sufficiently flexible so that every member can take full advantage of it at any time of the year. Let us take an hypothetical case and see how it works out:

Member Jim Brown is a station operator in a rather isolated section of the country and has never been to a conclave. He has been reading his ELECTRICAL WEST regularly, though, and keeping right up with what is going on in the industry. An idea unfolds in Jim Brown's mind. It seems to him to be a solution to one of the industry's problems he has been reading about. He jots his idea down on paper and sends it to the association office. It is turned over to the proper guidance committee.

The idea sounds good to them and arrangements are made for Member Jim Brown to meet with the committee and explain his idea in detail. It may be that he has the very key to the solution, or it may be that there were some angles to the problem with which Member Jim Brown was not familiar so his idea is not a complete solution; but he did contribute some sound, new thinking which advanced the committee much closer to the solution.

Here is another case—an instance where there was need of prompt action: Member Harry Jones is a manufacturer's salesman handling oilfield equipment. He gets an idea whereby if everyone interested in the same problem gets together and contributes certain data a report could be made that would crack a certain bothersome competitive fuel situation. The only trouble is that there is no committee organized to deal with such a problem and Jones hesitates to take the initiative and ask a group to get together to listen to his idea. So, he calls up the association office and, upon authorization of the guidance committee chairman, a meeting is arranged under the auspices of the P.C.E.A. Member Jones presents his idea, which is voted an excellent one; a recommendation goes to the directors for a committee to assemble the data, and another business development project is on its way.

These are merely imaginary cases to illustrate a point, but they are not entirely hypothetical. Following the conclaves in the fall of 1936 one member wrote, "I enjoyed the meetings very much. However, I am interested primarily in credit and was disappointed that there was no place given on your program to this important subject."

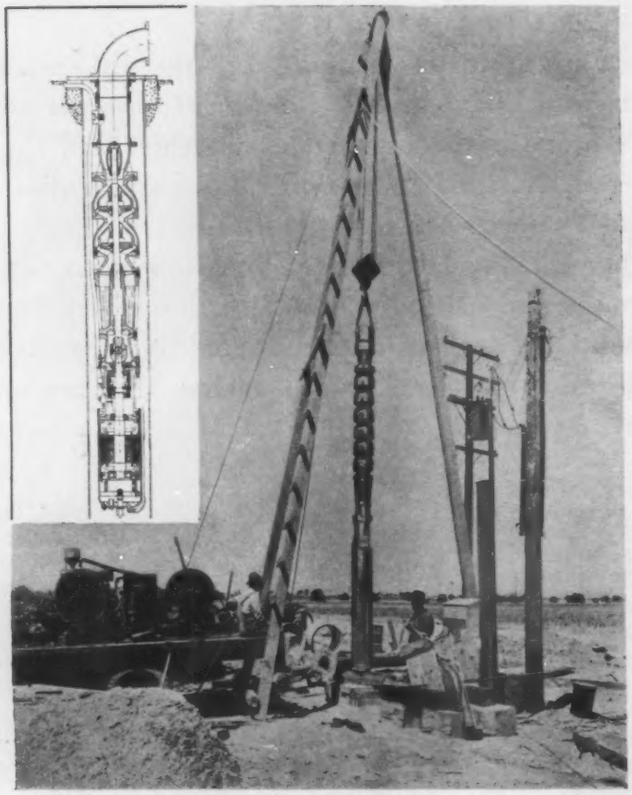
This member's letter was passed to the guidance committee of the Administrative Services Section with the result that during this current year considerable attention has been given to this truly "important subject." Here was one member who, by his constructive suggestion, made the P.C.E.A. of greater value, not only to himself, but undoubtedly, to many other members who had also wondered why no credit discussions were on the program.

The foundation of the present set-up of the association is that old saying, "You have an idea, and I have an idea. If we get together and exchange them we are both enriched as we each will then have two ideas." The electrical industry is like a great, complicated piece of machinery with countless parts, and it can function only to the extent that each of those parts operates efficiently. It has tremendous ramifications involving research, engineering, production, distribution, merchandising, installation. Men have specialized in these individual fields of activity and contend daily with the particular problems of their occupation; but many of the industry's problems have aspects which involve several of these fields and can be solved only through conference and consultation.

There is a great, potential force of latent brain-power in the electrical industry that has yet to be mobilized, and it is the hope of the officers of the P.C.E.A. that this organization may provide the medium for bringing out new ideas, sifting and weighing them and applying them where they will produce the greatest benefits. All that is needed to achieve this desirable goal is the whole-hearted support and participation of each individual member.

Toward this end we urge every member to attend whenever possible the conclaves, conventions and regional meetings, and to take an active part in the discussions. Furthermore, if you are interested in some subject which is not now included in the association's activities, we urge that you submit your suggestion to the association office in order that the guidance committee may have the benefit of your assistance in preparing interesting programs. Remember, unless you have advised the association of what you would like to receive from it, it is difficult, if not impossible to anticipate your wishes and furnish you with the maximum benefits to be derived from your membership.

Submersible Pump Simplifies the Deliveries of Irrigation Water



Pump and motor ready to be dropped in well. Inset—cross section of pump and motor

By MILES C. SMITH
Los Angeles

NEW submersible turbine pump which the Byron-Jackson Co., Los Angeles, is placing on the market should be of more than passing interest to every turbine pump operator. All too often the failure of pumping units in flooded areas has endangered health, even human life, and the assurance of pump operation as long as the electrical current can be conveyed to it, irrespective of what may be above it, is something which cannot easily be overlooked.

Then too, this new type of pumping unit operates as efficiently in crooked wells as in straight ones. It may pump from large and small bodies of water, cisterns, sumps and deep wells. Just so long as there is ample water or fluid level to keep the unit submerged and electrical current for power, operation goes on continuously or intermittently. Requiring no pump house above ground, it may be placed in restricted residential districts, beneath buildings or under highways. If the discharge line is below ground, the only thing required above ground is a switch for controlling the electrical current.

Although the Byron-Jackson submersible turbine pump is new to industry, it seems rather odd to use the word, "new," because this radical departure from the usual type of deep well pumping unit certainly didn't come into being over night. Nor is it the result of a happy thought. It is the outcome of many years spent in the pursuit of a single objective by two men who believed that the generally accepted turbine pumping assembly could be improved upon. It is an outstanding example of persistent straight-line thinking and development. As far back as 1920, J. B. Van Horn of Los Angeles, who has been continuously engaged in the pump business since 1908, joined hands with Earl Mendenhall, now manager and chief engineer of Sterling Electric Motors, Inc., also of Los Angeles, for the express purpose of working out a design that would fulfill every one of a rather long list of predetermined requirements.

Time has proven that it was a large assignment. The first submersible turbine pump was set 450 ft. deep in a well; powered with a 50-hp. electric motor, it was to deliver 250 gals. of water per min. against a 475-ft. head. As an indication of the thoroughness of research and development work, this test unit is still in operation even though it first turned over in February 1929.

Since that first installation, some 12,000 hp. of submersible motors have been put into service. One pump has a maximum capacity up to 4,000 gal. per min., another is successfully pumping against a head of 860 ft.

In December 1936, Byron-Jackson purchased all the patents covering this submersible turbine pumping unit and began preparations to build the entire assemblies of the various sizes and capacities in its Los Angeles plant.

The assembly as a whole is far from conventional design (see drawing). The electric motor is relatively long and of small diameter and the turbines set atop it. Between the pump and the motor is a grid type strainer that serves as the fluid intake, and the entire assembly hangs down from and is supported by the discharge pipe. Aside from this pipe, the only other connection with the ground level is a three-

Control equipment housed above ground; meter set on pole

URAL LOADBUILDING

conductor lead cable to transmit the electrical energy and a small copper tube which is clamped to the cable at frequent intervals. Neither the cable nor the copper tube need follow any direct course from the pump to the ground level or wherever the switching mechanism may be placed.

The pump itself comprises turbine units of quite conventional design. The bowls are set, one atop the other, to give the required capacity and, aside from the fact that their drive shaft extends beneath and not above them, they might easily be taken for the turbine units of any deep well pump.

But the electric motor is far from conventional. True, it is of the squirrel-cage, induction type, and, in so far as its electrical principles are concerned, it isn't so different from other squirrel-cage motors. The difference lies in its shape and the provisions which are made for long periods of service without attention and to exclude water from the windings.

The rotor of the motor is carried on two radial ball bearings. One bearing is a radial thrust which takes the hydraulic load of the pump and also the weight of the rotary parts of the assembly. The other bearing centers the rotor. The motor is entirely immersed in oil of high insulating value which volatilizes at a relatively low temperature. In operation, the oil circulates through the motor, lubricates the bearings and fills the operation gap between the rotor and stator with oil vapor to reduce the rotation friction and increase the motor's efficiency.

For safety's sake, the motor is provided with an automatic electric alarm relay which cuts off the energy supply when the oil level gets dangerously low. Should this happen, oil is poured into the motor through the small copper tube which accompanies the lead cable to the ground level and operation may be resumed. Experience has proved that this oil alarm is more precaution than necessity, for units have run as long as five years without the oil supply placed in the motor at the time of its installation being added to or changed.

As a seal against the infiltration of water along the drive shaft, a cup containing a small amount of mercury rotates with the shaft and a cylindrical stationary sleeve dips into the mercury. Through the fact that mercury has such a relatively high specific gravity and will not readily mix with either oil or water, the mercury cup separates the water from the oil and forms a perfect and permanent seal against water infiltration into the motor windings.

Eighteen years ago, Van Horn and Mendenhall set down the following as the principal requirements that must be attained before the submersible pump could become a reality:

1. A submersible motor with sustained mechanical and electrical efficiency over a long period of continuous or intermittent operation.
2. Operation without adjustments or care and requires no attention when shut down.
3. Design that would permit of quantity production and reasonable sale price.
4. A unit that could be installed and operated by inexperienced operators.

Centrifugal Pumps to Counteract Floods

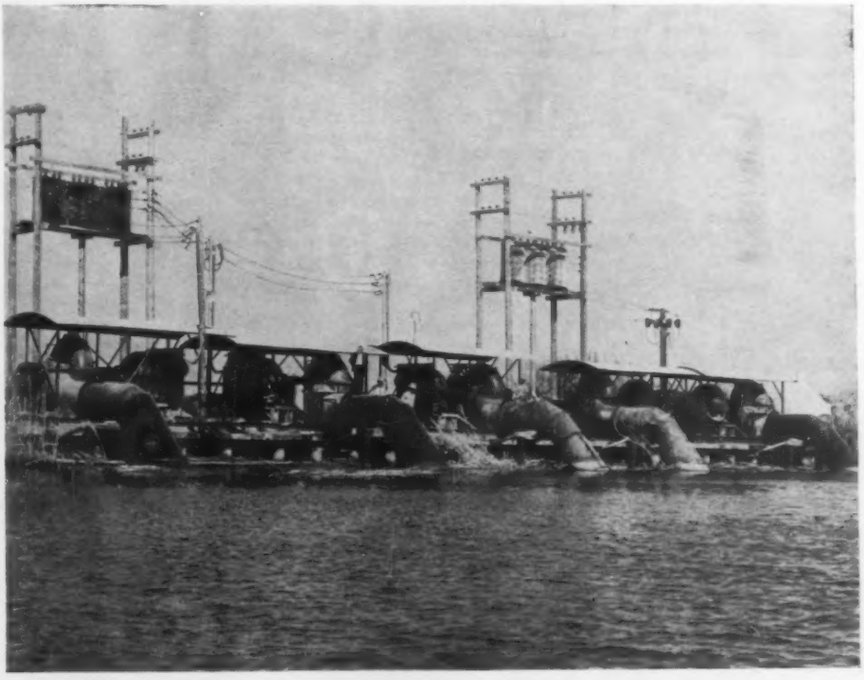
Floods mean destruction to the Tulare Lake, Calif., region. Unless the water can be held back, thousands of acres of valuable wheat and cotton land may be ruined. To protect themselves, therefore, farmers have raised dykes round Tulare Lake in order that they might reclaim the rich surrounding land.

Despite their efforts, however, floods last year swept over the lake bottom and inundated 56,400 acres. The farmers immediately fought back. In hopes of making a good grain crop this year, a farming company had installed several large pumps to clear a 5,800-acre field of the water.

Installation, made by the Corcoran Electric Co. and the San Joaquin Light & Power Corp., consisted of 1,200 hp. in five centrifugal pumps. Total line built to power the pumps was 934 ft. Pumps operated 21 days and moved, over the dykes into Tulare Lake, an estimated 25,000 acre ft. of water.

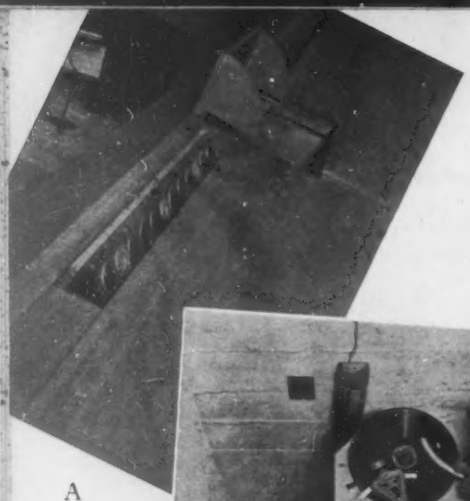
During the operation flocks of pelicans, sea gulls, mud-hens and other water fowl disported themselves as shown above right. For them the floods meant food, because great numbers of fish were discharged through the pumps.

In charge of the San Joaquin company's part of the operation was F. C. Carroll, district manager of the Corcoran district (above left, center).

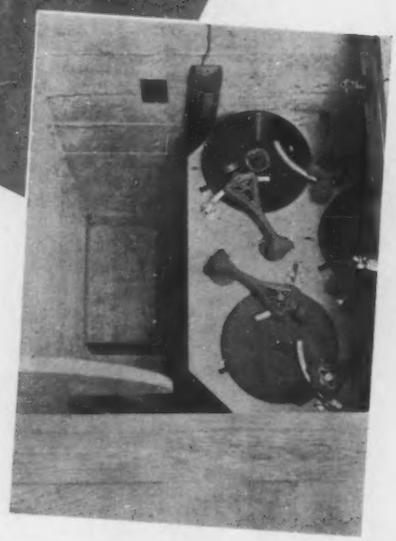


An Experimental Laboratory

Leland Stanford University's Testing Ground for Theatrical



A



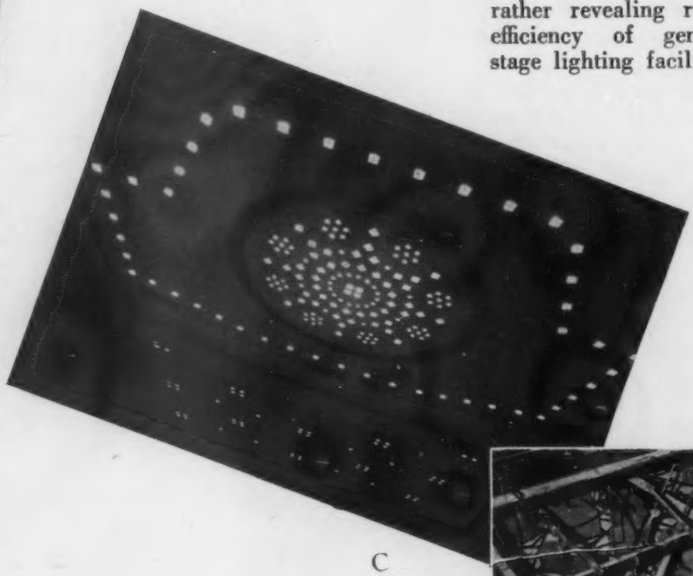
B

MUCH as it did when it established a high voltage laboratory, Leland Stanford Jr. University has gone into speech and drama—thoroughly and fully implemented, with the most versatile equipment available to develop the technique to its utmost. The new Memorial Theater on the Stanford campus is more than an auditorium in which plays may be produced or drama taught. It is an experimental laboratory of the theater, embracing each of its corollary crafts—costuming, scenic design, and stage lighting.

It is this stage lighting work which will be of chief significance to the electrical industry. Consistently enough the technical staff of the theatre is working closely with the already well known illuminating engineering laboratories under Dr. Leland H. Brown. In fact, for the first time, lighting equipment for the stage was selected under photometric standards—with some rather revealing results as to the efficiency of generally accepted stage lighting facilities.

A—Footlights in both main and little theater are in 5-ft. sections. Main stage has six sections, each with four circuits (colors), three 100-watt reflectors per circuit. By switching at a panel near the plug board, any of the four circuits in any section of foots may be cut in or out to provide restricted lighting or special localized lighting for narrow stage sets. Prompter's booth is in the center of stage

B—Looking down into prompter's booth, equipped with 3 turntables and 6 electric pickup arms by which recorded sound effects can be operated on cue. Records come with various sound effects in distinct bands. Double pickups permit use of two sound effects off the same record at once



C

D

C—Entire house lighting is done with inconspicuous in-built Holophane units arranged in the pattern shown, controlled in five groups: center group of large units, 100-watts each; center smaller units, 40-watts each; border around main auditorium ceiling, 200-watts each; under balcony units, 200-watts each; units over the balcony, 100- and 150-watts. Circuiting is so arranged that when any part of the units are on, a symmetrical pattern will be retained. Another provision is that house lights, through a locked switch, operating contactors, can be turned on at certain entrances to the house. Since the auditorium is used for classroom purposes, level of intensity over the main floor in front of balcony is uniformly 20 ft. candles when all units are on. Circuiting is arranged on house light section at hysterset control board (F) that either entire house, main floor alone, or main floor in front of balcony may be lighted. This permits audiences of 1,750 full house, 900 with the curtain over the balcony lowered to the balcony rail; or 600 when the curtain is lowered to the main floor. Curtain is in 3 sections, middle one not being dropped in case projection machines at rear of the house are used in a scene

D—Ceiling lighting units are in individual metal boxes, with the lens plate attached, resting in a metal plaster ring in the ceiling. Each unit is individually plugged to a plug strip (numbered), above the ceiling. An indicating bullseye aids in finding the unit needing relamping. Units are lifted out and disconnected for relamping, cleaning, or replacing. Emergency lighting selects enough circuits in the main house, balcony, under balcony, stairways, stage, shop, and corridors between dressing rooms, to permit seeing. It operates through an automatic transfer to a d.c. battery and charger system

E—Plug board in a corridor under the stage from which stage lighting circuits of either, or both, the main stage or little theater stage may be selected to be operated through the reactance dimmers (G). Eight pairs of cords are connected to each reactor (4 kva.) divided into two groups, through disconnect switches in the face of the panel to permit one-half of cords to be used in operation, the other half to be preset for the next scene. Each cord may be lock-plugged above into any of four rows of circuits ranged in steps to correspond to lettered groups instead of colors. Each circuit is protected by its own fuse (in the upper face of the panel). The stage reactor bank (G) with 24 4-kva. reactors, and four hot circuits without reactors, may be connected through this plug board; house lights are permanently connected to their own reactors. Any number of reactor controls can be assigned to either theater through a transfer switch. Load circuits feed into the plug board, are multiplied on the reactor banks. The latter are protected by circuit breakers to prevent overloading

F—Control desk is located in a niche approximately at the first row of seats, yet down in the orchestra pit. The lighting director, in full view of the entire stage, can control the entire stage and house lighting through the hysterset potentiometers. (Description of its operation on next page.) This is all the stage lighting board there is

of the Theater

Memorial Theater Becomes Lighting as Well as Drama

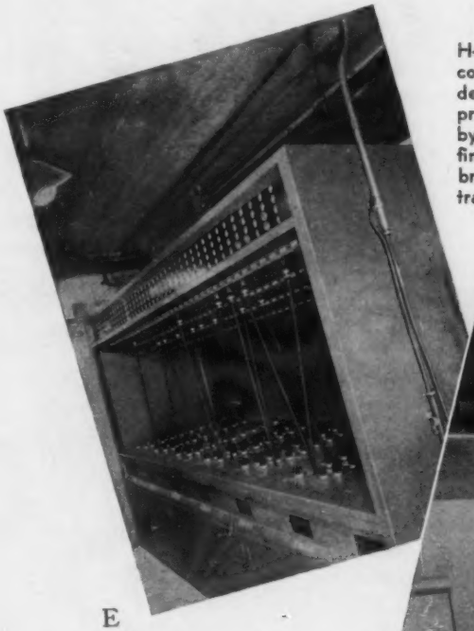
In order to provide a laboratory of theatre lighting in the fullest sense of the word, the design of the electrical system and the selection of a light control medium were required to afford the widest range of possibilities. Hunter and Hudson, consulting electrical engineers, San Francisco, worked closely with the electrical engineering and illuminating engineering departments, as well as with the technical director for the department of speech and drama, in developing the plans.

Choice was made of the Ward Leonard Hysterset control and reactor dimmer system, assembled and built into the control desks and dimmer racks by Square D. Co., in conjunction with a plug-in board for the selection of circuits to be so controlled. The latter was made by Trumbull Electric Manufacturing Co. Roy Butcher, electrical contractor, San Jose, also worked closely with R. E. Grady, of Hunter & Hudson, Roy Anson of Square D, Robert Dummel of Holophane, Charles Barkus of Trumbull and others contributing thought and design to the completed project.

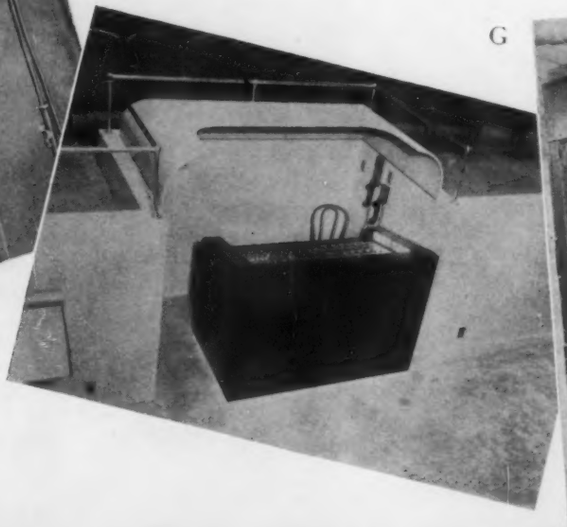
Some important points in the electrical installation not covered in the captions to the pictures on these pages will be found on the next page.

H

I



E



F

G

H—Stage and auditorium from the balcony. Arrow points to lighting control desk location. Balconies on each side of proscenium lighted from directly above by built-in lens control units. Walls are finished in warm tan, with a low surface brightness on all vertical surfaces, concentrating all interest on the stage picture

I—Little theater, seating 196, for rehearsals or classwork, yet fully equipped. Control desk is located in projection booth at extreme left. Ceiling units are lamped 100-watts in the center units, 150-watts on outer rim. Uniform classroom intensity of 25 ft. candles is attained. All stage lighting circuits are assigned to reactance banks through the main plug board serving both theaters

Main pilot board, in orchestra pit, from which stage (left) and house (right) lighting are completely controlled

In design of the wiring to permit of utmost flexibility, adaptability and dependability a thoughtful arrangement of circuiting was created. Used both as a classroom and as a theater, the house anticipates and provides for several contingencies.

The main theater lighting, besides being served from two sources of power, through a contactor and main bus from the transformer vault, also has an emergency lighting bus and selects certain circuits for emergency operation. A typical circuit leaves the main bus, goes through contactors, then through a magazine distribution panel to the load, then back through the reactor dimmer to neutral. Action of the reactor dimmer depends on energizing the core with direct current; normally with no d.c. on the reactor core, no current can pass. Therefore a by-pass switch is provided so as to permit operating the lighting either on the emergency system or from door entrances to the auditorium when it is used simply as a classroom.

Dimmer Control

The dimmer control consists of three circuits, (1) pilot control circuit, (2) hysterset circuit, and (3) lighting and dimmer reactor circuit. The pilot board control circuit is designed to furnish d.c. current of adjustable magnitude to the corresponding hysterset unit through a dry disc full wave rectifier. On the pilot board in the orchestra pit, from which the technical director operates the lighting, are, at the left, the stage section of four groups of circuits, corresponding to four colors (although in this case any colors can be used as predetermined) with accompanying selector switches, pilot lamps, and individual potentiometers by which to operate through the hysterset. The master potentiometers are at the end of each row. Grand masters for both house and stage are selectable on a small panel below.

Simply stated, the direct current passing through the potentiometers is increased or decreased by the sliding resistance. By use of duplicate masters and selector switches, cross control of units in the same color or group is obtainable and can even be operated in opposite directions if desired. The masters are auto-transformers which displace the individual circuit "sliders" or potentiometers, and thus offer a wider range of control.

The d. c. thus controlled energizes the middle leg of a three legged reactor, thus controlling the condition of saturation of the iron. The outside legs are connected to the 120/240 volt supply and through the anode of a rectifying tube. By means of necessary adjusting and balancing equipment the possibility of feeding back a. c. onto the pilot control is prevented. Direct current flow thus regulated in the hysterset again goes to the final reactor dimmer, similarly to excite the center core of another three legged reactor. When not excited, the impedence of the two a. c. coils is such as to drop voltage to "black-out" the lamps on the controlled circuit. Necessary booster transformers add the voltage required when the lamps are required at full brilliance and also compensate for any voltage drop in the control circuits.

From the standpoint of availability of lighting sources the wiring design is interesting. Besides the sections of disappearing footlights (4 on the little, 6 on the main stage) the main stage has a main bridge and two regular borders and provision for a third. It has back and side cyclorama battens, and tormentors on each side. There are three 4-gang pockets on each side, and two 4-gang pockets at the rear. To make all stage equipment interchangeable and usable in any combination, standard twist lock receptacles are used throughout instead of conventional stage plugs. For the borders rails and plug strips are provided instead of permanently fixed border troughing, permitting use of equipment elsewhere. There are also two pockets in each of two ports hidden in the balcony niches just outside the proscenium, as well as 3 positions above the main ceiling for spots. All of these are on dimmer control and color circuit control through selection on the plug board.

In the little theater there are two borders, a cyclorama border, and two 4-gang pockets on each side; likewise two ports in the ceiling for spots. Projection rooms in both theaters are fully equipped for two professional projectors, spots and sound equipment.

There are two intercommunicating phone systems, one a general one connecting all stations at stage, dressing rooms, projection booth, ticket office. etc.; the other for use in case the first is busy between the stage director's pilot board in the orchestra pit and projection room and plug board and stage. The technical director also has a black-out switch operating through contactors.

Dr. Brown and the illuminating engineering testing laboratory were assigned the task of selecting the most efficient and sturdy portable equipment for stage lighting. Manufacturers of stage lighting equipment were asked to submit photometric data with their bids, yet none could, for none had it. Visual inspection of the proposed equipment resulted in discarding several makes for obvious faults.

Some of the factors which were considered detrimental were: flimsy construction, slow focusing, sticky focusing equipment (especially when hot), improperly cooled handles, difficulty of relamping. Many had excessive color rings and filament images. There were few which had enough range in the attainable spot size. In tests many were found to crack lenses. In some the lamps themselves even melted. It was concluded that for the most part

theater lighting equipment had been developed in shops on a cut and try basis, and that the design of theater lighting equipment probably could use the services of some illuminating engineering for improved efficiency.

It is interesting that for the cyclorama lighting nothing was found really satisfactory in the field of stage lighting equipment and that the final selection was that of outdoor floodlighting units with Alzac aluminum, one third stippled reflectors.

Stanford's theater is still seeking and experimenting with stage lighting. There is reason to hope that from this well designed laboratory of the theater not only drama, speech, costuming and scenery will be developed, but that theatrical lighting too can be improved and extended.

●

Survey Reveals Woeful Lack of Wiring

If home wiring in a well-to-do district is woefully inadequate, it must be unspeakably terrible in the average district. Such is the one conclusion that can be drawn from an adequate wiring survey conducted in the rich San Jose-Peninsula, Calif., district by John S. C. Ross, sales manager of Pacific Gas and Electric's San Jose division.

Mr. Ross' survey, covering 482 new homes, shows that: (1) Sixty-eight per cent of the homes have ¾-in. service conduit; 21 per cent have 1-in. conduit; 8 per cent, 1¼-in. conduit; 2 per cent, 1½-in conduit. (2) Ten per cent of the homes have service wires, sizes No. 10 and 12; 62 per cent have two No. 8's; 21 per cent, three No. 8's; 3 per cent, three No. 6's; 4 per cent, three No. 4's. (3) Thirty-four per cent of the homes have branch circuits, size No. 14; 62 per cent have No. 12; 3 per cent, No. 10. (4) The average number of lighting outlets is 13.5; the average number of convenience outlets, 10.6.

What these figures mean is obvious and, to the electrical industry, painful. Less than one-third of the houses now being built in the San Jose-Peninsula district are equipped with wiring in excess of minimum Underwriters Code requirements.

Translated into terms of the typical 5- or 6-room house with 3,000 sq. ft. of floor space, the figures give a more startling result. Families in 68 per cent of the San Jose-Peninsula houses are restricted to the use of 3,850 watts of electrical equipment (diversity on appliances not considered).

All this in spite of the fact that the present-day requirements of the average home, according to Mr. Ross, are 15,490 watts, or almost the exact allowable load for a service consisting of three No. 6 service wires in a 1¼-in. conduit.

Mr. Ross doesn't carry his argument much further. Only solution he attempts to make is that the electrical industry fight to get at least as much out of the home-builder as the plumbing industry does; that the 1¼-in. conduit be made the minimum requirement.

On the basis of his report the San Francisco conclave of the Pacific Coast Electrical Assn. has recommended that the man-power of the Pacific Coast Electrical Bureau be built up to the point where it can teach the public, contractors and architects that adequate wiring is essential to better living; that a committee of advertising men from the industry be appointed to confer with the Red Seal committee on an adequate wiring publicity and advertising campaign.

●

Lighting Fixtures Discussed by I.E.S.

James Meyberg, president, Lighting Fixture Industries of Southern California, took the brunt of discussion on the chin like a hero when he opened the way for a friendly crossfire of suggestions and criticisms of present day lighting fixtures at the Feb. 8 meeting of the Southern California Section, Illuminating Engineering Society, in Los Angeles. It was a joint meeting of fixture men and illuminating engineers. Contending that adequate fixtures must be designed both to give good lighting efficiency and appealing decoration, Mr. Meyberg deplored the present public attitude toward lighting fixtures. His association, he said, was sending out to all those who file for building permits, a card setting forth suggested percentages to be allowed for proper fixturing. With fixtures allowed a percentage of the building dollar less than wiring, he declared only poor fixtures of poorer efficiency could be expected.

Suggestions from the illuminating group included several pertinent ideas, all of them along the line of selling the public more thoroughly by rendering a service of better seeing, and decorating the fixture after the real lighting equipment itself had been first sold on its value to the user. The portable lamp, which fixture men have found to supplant permanent lighting fixtures, had been in the same disrepute as lighting fixtures are today until it was redesigned to provide seeing first and decoration afterward, it was pointed out.

Two School Lighting Tests Initiated

Caution is the keynote of almost all school relighting programs. In spite of general knowledge that the majority of schoolrooms are badly illuminated, school boards, looking to their budgets, proceed at a slow pace when undertaking any corrections. No exception to the rule are northern California and Utah.

Two-year's time is allotted to exhaustive tests now being made by the Vallejo City School Board, assisted by the Sight Conservation Council of Northern California, on two classes of sixth grade pupils at McKinley School. Under the plan, one classroom is being left as is, the other is being relighted and redecorated according to specifications prepared by Leland H. Brown of the illumination laboratory at Stanford University. In the latter, two photo-electric cells are being used instead of the customary one. Pupils in each room are given achievement and reading tests at the beginning and end of every semester.

In Provo, Utah, similar, if not so exhaustive, tests are being made with the photo-electric cell. Findings will be studied by the school board in making plans for the construction of several new schools.

●

Diagrams Explain New Code Changes

When Harry Dobson, by means of large diagrams drawn on large sheets of butcher paper, illustrated quickly and conclusively the significent changes in article 230 of the 1937 edition, National Electric Code, the idea was so popular that other inspectors assigned chapters of the new code to discuss at future meetings have been asked similarly to diagram their presentation. Mr. Dobson had ben using such diagrams to hold meetings with the contractors and wiremen of Santa Barbara, of which he is chief inspector, and so used the same method in presenting his assignment to the last meeting of the Southern California Chapter, Southwestern Section, International Association of Electrical Inspectors, in Santa Barbara. It was the first chapter meeting over which the new chairman, A. J. Kay, of Anaheim, presided.

Next meeting, Mar. 23, will be held in the city of Past Chairman Crannell, Glendale. Because Long Beach is to have the Southwestern Section convention in the fall, it gave up its usual May meeting, and Ontario was chosen for the May 25 gathering.

Toward More "Seeing Ability"

A close watch on unobserved burnouts, aged lamps, under-voltage burning and direction of light to point of usefulness may help to save one-third our lighting costs

By SAMUEL G. HIBBEN
Director of Applied Lighting
Westinghouse Lamp Division, Bloomfield, N. J.

EMPTY sockets and unobserved burnouts take their toll of lighting efficiency. Fixed charges, as cost of installation and investment, continue whether the socket is empty or full.

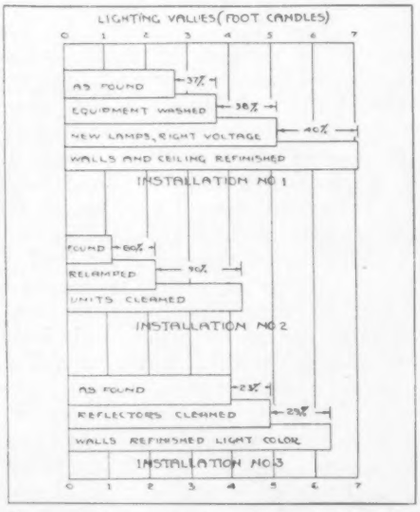
Obviously the unobserved burnout is doubly to be avoided because if the unit appears ready for service and yet fails to function in an emergency or need, it represents a definite loss, sometimes an accident hazard. If an installation of a plurality of sockets can be found satisfactory when a considerable number of the lamps are burned out or removed, then the prima facie evidence is that the lighting plan was at fault. Surplus dead sockets cost something as standby investments and one would conclude that the most economical installation should have been based upon the minimum number of sockets, but each lamped and doing its full share of duty.

We have previously remarked that aged lamps in a properly maintained system should be removed even though still capable of burning. Happily, the American-made lamps of high standing infrequently blacken so seriously as to necessitate removal before burnout. There are cases on record, however, where lamps may live much beyond the designed life and degenerate into electric heaters. They become like the hose-nozzle that might gradually be allowed to have its orifice reduced in size and from which less and less water flows. Consequently the up-to-date user in many instances finds it economical to remove lamps which have burned beyond their normal period and have become darkened.

A moment's calculation will disclose the very slight cost of this perfection of service. For example, consider the 100-watt Mazda lamp which the reasonably large user will purchase for 20c. During its rated 750-hr. life it will consume 75 kw.-hr. of energy at 3c per kw.-hr or $2.25. A 9 per cent average loss of efficiency during such a burning time (say the second 750 hr.) would be equivalent to 20c or the cost of a new lamp.

Another pocketbook problem in connection with the economics of maintenance is the under-voltage burning of the lamp. The general features of wiring and voltage have been discussed previously but under our present consideration comes the matter of voltage as affected strictly by maintenance. To a minor degree, there may be some loss in voltage due to any corroded contacts throughout the system. To a greater degree, there is a voltage loss resulting from haphazardly extending or overloading branch circuits, a temptation that exists through practicing the false economy of saving a little copper at the cost of lumens.

The voltage drop in any system should not exceed 2 per cent. In the main this is counter-balanced by providing a slightly excess voltage at the service entrance or the distribution panel. The cost evaluated in units of light amounts to approximately a 3 per cent diminution of illumination for a 1 per cent drop in voltage. Consequently the highest economy dictates that there must be the closest possible agreement between the designed and rated voltage of the lamp and the actual socket voltage, or that the latter be not less than the former. By over-voltage burning, one gains light at the cost of life, but as lamp bulbs have been and are in general constantly decreasing in first cost, this angle of operating costs deserves much careful study.



Three graphic case histories showing the value of renovating lighting installations

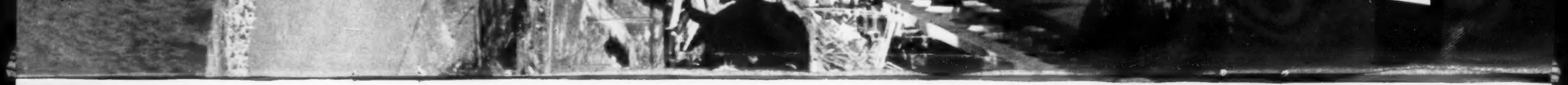
Finally, in our endeavor to strengthen each link and to secure the most seeing ability for our dollar, we must direct our generated light to its point of usefulness. If the glass reflector be broken, the light is wasted sidewise since the proper reflector usually increases the usable light from two to three times over that from the bare lamp. If the metal reflector becomes tarnished or bent much the same thing occurs. If—and this is an important point—the wrong size lamp bulb be inserted in the reflector, then the emitted beam is changed and the combination loses effectiveness. For example, a 200-watt size of RLM reflector and corresponding wattage of lamp will emit light with an output efficiency of about 70 per cent. If a 150-watt lamp be inserted in this same reflector the output efficiency drops to about 62 per cent. One of the best checks on this loss is to guard against the careless interchange of bulbs and accessories.

The whole secret of an efficient lighting installation after it has once been properly installed lies in planned periodic attention. Frequently sight meter surveys are recommended in order to detect depreciation. Above all, the maintenance must be made the regular duty of a reliable employee who appreciates the worth of his job. He should receive credit for doing a good job.

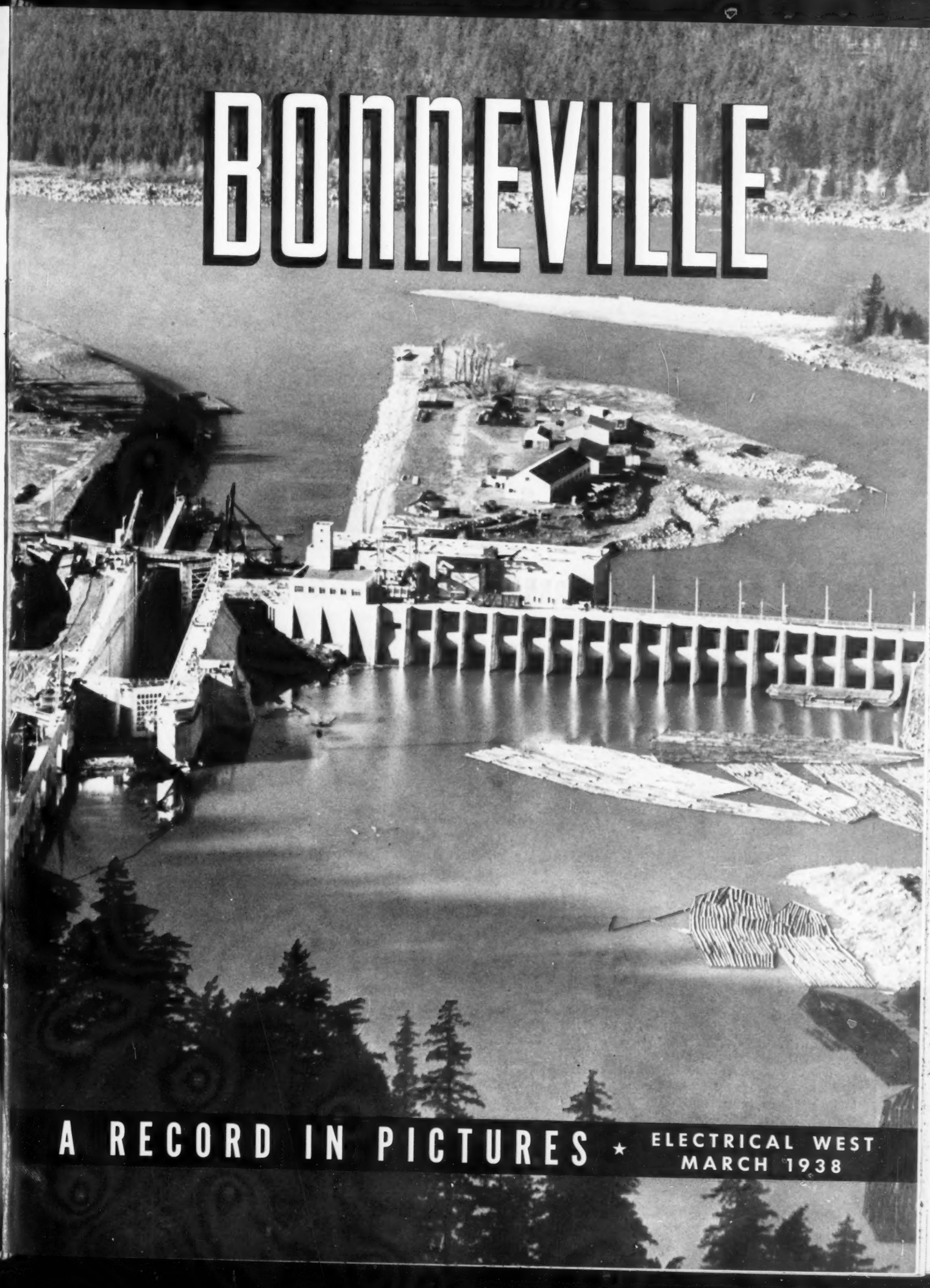
Neglect that is quite common today has been proved to reduce the possible illumination by an estimated amount of easily one-third. Reasonable maintenance seems to cost much less than the value of the light gained thereby. The total lighting bill of the United States last year was perhaps 690 millions dollars. Adequate and intelligent maintenance may save one-third of our lighting costs or may add a corresponding amount to our usable illumination and may therefore be worth $230,000,000.

●

DESIGNATED "BOSS'S NIGHT," the April meeting of the Electrical Maintenance Engineers Assn. of Southern California will be given over to entertainment of the maintenance men's superintendents. The association's trip to Boulder Dam Feb. 11-12 will be described in the next issue of ELECTRICAL WEST.



BONNEVILLE



A RECORD IN PICTURES ★ ELECTRICAL WEST MARCH 1938

THE DAM THE ARMY BUILT

Army engineers found Bradford Island site ideal for the downstream unit of ten Columbia dams

CONCEPTION of a dam at Bonneville grew out of the U. S. River and Harbor Act of January 21, 1927. This set in motion surveys to form plans for the most effective improvement of the nation's important navigable streams, for purposes of navigation in combination with the development of water power.

Out of these surveys came the Columbia River plan, encompassing ten dams so constructed that all but 95 ft. of the total head above tidewater and below the international boundary might be utilized for power. Three of the ten are realities: Grand Coulee, under construction in 1938 by the U. S. Bureau of Reclamation; Rock Island, built earlier by Puget Sound Power & Light Co., and Bonneville.

Undertaken on September 30, 1933, under provisions of the National Industrial Recovery Act, as P. W. A. Federal Project No. 28, Bonneville Dam was formally authorized by Congress in the River and Harbor Act approved August 30, 1935, the Corps of Engineers, U. S. Army being designated construction agency.

Bonneville lies 40 mi. east of Portland, 143 mi. from the sea. Above it, from the Canadian border, the Columbia flows 750 mi., drops 1,288 ft., and drains 220,000 sq. mi.

During 1879 to 1933, mean flow was 214,000 sec.-ft., average annual flood flow 500,000 sec.-ft., minimum flow 40,000 sec.-ft., and maximum 1,170,000 sec.-ft., recorded in June 1894. Flood discharges, the result of melting snow, usually reach peaks in June.

From Vancouver (adjacent Portland) to Bonneville natural river depths were measured at 7 to 50 ft. At Cascade Rapids, 3 mi. upstream was a 25-ft. fall, above which a pool extended 40 mi. to the Dalles.

These factors then: total river development, flow variations, the relation of river bottom to navigation—plus suitable earth formation for foundations—led to selection of Bonneville site.

When Congress acted in 1935 construction got into full swing quickly, for much preliminary work had been done through PWA. The effort to keep men employed did, however, place unusual burdens on design engineers. Particularly in electrical phases, construction frequently was but a pace behind design.

Table I—Federal Power Commission Allocations to Bonneville Power

Total Initial Cost of Project	$53,188,800
Cost of Initial Power Installation (86,400 kw.)	9,180,500
Cost of Navigation Facilities	5,517,600
Cost of Dam, Reservoir, Fishways and All Other Facilities Having a Joint Value for Power and Navigation	38,490,700
Allocation of Joint Facilities Attributable to Power	32.5 per cent
Allocation of Costs to Initial Power Development ($9,180,500 plus one-fifth of 32.5 per cent of $38,490,700)	$11,682,400
Total Estimated Ultimate Cost of Project	74,144,600
Cost of Ultimate Power Installation (504,000 kw.)	29,448,000
Cost of Ultimate Facilities Having Joint Value	39,179,000
Costs Allocated to Ultimate Power Development ($29,448,000 plus 32.5 per cent of $39,179,000)	42,181,000
Proportion of Ultimate Total Cost Allocated to Power	57 per cent

But as work proceeded and dams spread across the two channels separated by Bradford Island, there came into being a power development which carried engineering practice forward on many fronts.

Especially noteworthy are: Kaplan turbines, biggest in the United States and of greater capacity than any others in the world; generators, physically the largest built; governors, also world's largest and, like the concrete intakes, scroll cases and draft tubes, setting new standards of design. The Kaplan runners measure 23 ft. 4 in. in diam., are exceeded by those of 26-ft. 3-in.-diam. at Vargon, Sweden, and by those at Svir, Russia (24 ft. 4 in.). But their normal rating of 60,000 hp., maximum 66,000 hp., is scarcely approached by the next largest, 42,500-hp. units at Safe Harbor, U. S. A. Low head and low speed determined the generator size but kept the electrical rating below that of others, notably at Boulder Dam.

Design of the main-channel spillway dam grew out of exhaustive tests by army engineers on a 1 to 100 model at Linnton Hydraulic Laboratory below Portland. Constructed of sand and concrete, the model represented a 3½-mi. stretch of the river including the site. Hydraulic data were determined from wood models of the proposed structures. Scroll cases and draft tubes likewise were tested at Linnton, use of transparent pyralin permitting photographic study.

Specified for the original structure were two main units totalling 86,400 kw., and a 4,000-kw. station unit. For the accommodation of four more main machines, a skeleton structure was built integral with the initial powerhouse, and design made provision for eventual extension to ten units, with installed capacity of 432,000 kw.

In the fall of 1937, two years after authorization, the house unit was placed in service. By year's end the initial installation, except major transmission and switching equipment, was virtually complete, and operation was scheduled for June, 1938.

Aside from power are the dam's benefits to navigation. By dredging below and filling the pool above, a navigable channel will be available to ships up to 24-ft. draft, from the river's mouth to the Dalles, 186 mi. upstream. The navigation lock, a part of the project, sets another record—having the highest single lift.

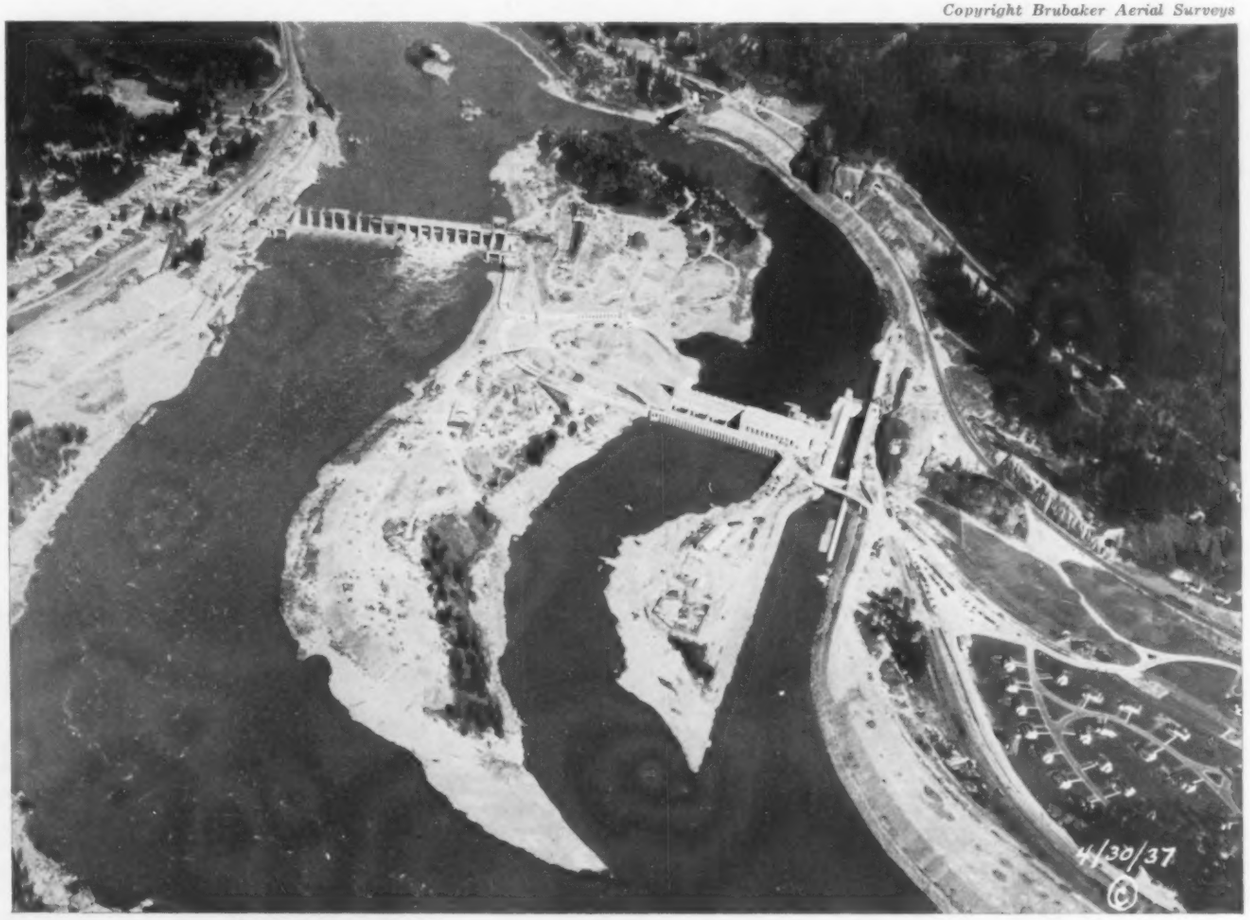
In 1937, by act of Congress, operation of the navigation lock, power-generating equipment and dam proper was placed in the hands of army engineers, while other duties were assigned to an administrator. In September 1937, James D. Ross accepted this appointment, thus took on the task of administering and marketing the energy produced and of supervising construction of facilities for transmission and distribution.

Costs were allocated by the Federal Power Commission in February 1938, as shown in Table I. Not included are transmission facilities, for which $3,500,000 were being sought. On the FPC allocation of project costs rests the determination of power rates.

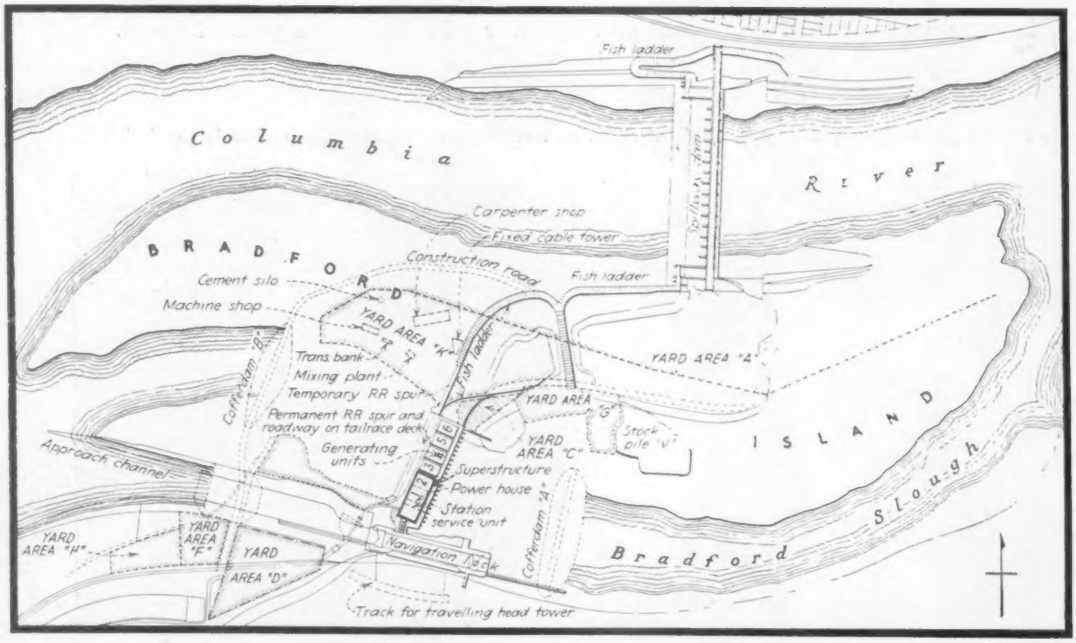
To the North Pacific Division, Corps of Engineers, U. S. Army, ELECTRICAL WEST is grateful for the hearty cooperation which so greatly facilitated publication of this pictorial record.

Bonneville project has four major parts: spillway dam, fishways (part visible on Bradford Island), powerhouse and navigation lock

Copyright Brubaker Aerial Surveys



CONSTRUCTION



SCHEDULE of construction was influenced by the effort to create employment in the winter of 1933-34. Make-ready proceeded until Congress authorized the project in August, 1935. Tracks of the Union Pacific and S. P. & S. were raised to higher ground. Coincidentally the Columbia River highway was realigned, but not as part of the project.

SITE (map opposite page) is 40 mi. up the Columbia River from Portland, Ore. Here, near the axis of the Cascade Mountains, the river has cut through 6,000 ft. of volcanic formation. The river flows westerly in two channels, separated by Bradford Island. Main dam is in the north channel, powerhouse and navigation lock in the south channel.

MAIN DAM (top opposite page) was built by Columbia Construction Co., made up of five of the Six Companies, builders of Boulder. The 800-ft. channel was widened to 1,200 ft. by dredging at both shores. The south-half cofferdam (shown) was made up of 21 timber cribs, built on Bradford Island, floated to position and sunk. Flooded by April 1935 freshets, it was unwatered in the fall, base then poured to El. -8, piers brought up to full height. North half construction followed, bays between piers poured, base brought to full height, El. 24. South-half bays were then poured one at a time. Concrete plant appears on Washington shore, cable way connecting to two movable towers on Bradford Island.

POWER HOUSE AND LOCK (bottom opposite page) were built by Guy F. Atkinson Co., General Construction Co. and J. F. Shea. Earth dams block off the south channel, which was unwatered by pumping. Lock is at left, powerhouse next to right, concrete plant for this contractor on Bradford Island, movable towers on Oregon shore.

BEDROCK is a sedimentary deposit of volcanic ash, mixed with rock and pebbles of all sizes, locally known as Eagle Creek formation. Main dam rests directly on this. A limited, mushroom-shaped intrusion of high quality andesitic lava forms the powerhouse and lock foundation.

CONCRETE PLANT (top right) for the main dam. Four 4-cu.yd. mixers turned out 4,500 cu.yd. per day. Portland puzzolan cement containing 25% calcined puzzolan was furnished by rail to contractors bins. Aggregates were secured from deposits 26 and 54 mi. upstream. Required compressive strength of main dam slabs, beams, etc. was 4,000 lb. per sq. in.

POURING (second right) the powerhouse. Cableway tower is on Bradford Island. Main dam terminal tower on Washington shore at far right. Most pouring was from 8-yd. buckets, some of the main dam from hopper cars.

FIRST BUCKET (third right) was poured in the main dam Sept. 16, 1935. More than 1,000,000 cu.yd. followed.

DOWNSTREAM APRON (fourth right) baffle blocks are to retard water, reduce scouring on main dam. View is within north-half cofferdam.

CROSS-SECTION (bottom right) of main dam. Curved base of the completed portion has its top at El. 24. From there, piers rise to support the steel gates.

GATES (bottom left) to fill the eighteen bays in the main dam were assembled on the site by Columbia Steel Co. Twelve are 50x50 ft., six are 50x60. Each weighs 200 tons. They are horizontal framed, riveted, carry roller bearings. Assembly is in two sections with automatic lifting and latching mechanism so that either the upper half or the whole gate may be moved at once. Six of them are equipped with electric heaters to prevent their freezing tight in place.

COMPLETED...

PEACEFUL as the Columbia appears at top of the opposite page, once in 10,000 years a 1,600,000-sec.-ft. flood is anticipated. The main dam, viewed here from downstream, is designed to pass such a flood, which is 37% greater than the maximum recorded in 1894. Flood and foundation conditions dictated design. Ten to 15-ft. excavation into sound rock plus great weight prevent sliding at the base. Mass concrete, gravity type, the dam stretches 1,250 ft. with 900-ft. spillway crest. Base width is 180 ft.; height above lowest foundation, 170 ft. Principal elevations are: gate sill 24, normal pool water surface 72, service roadway 99. Flood waters will rise to 82.5.

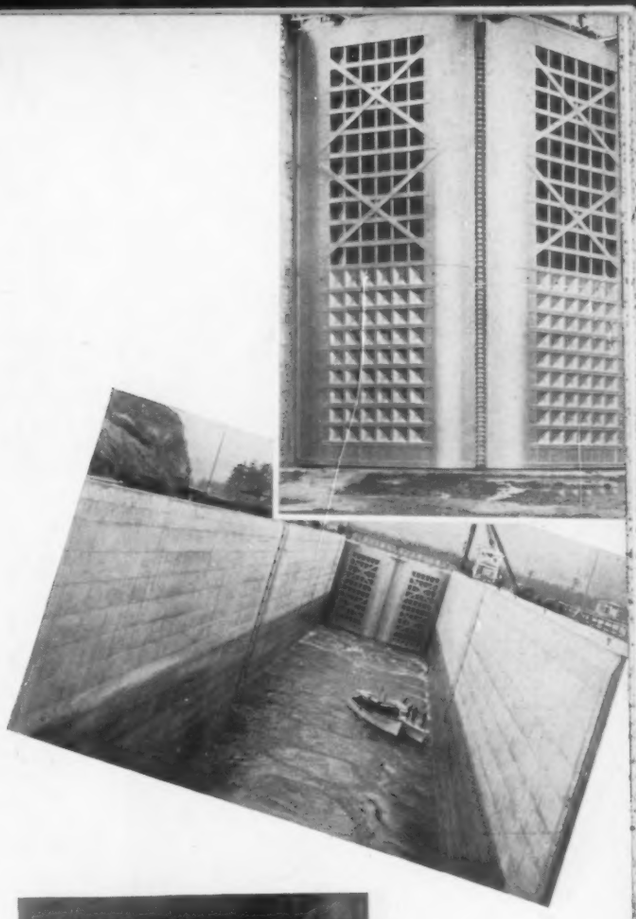
POWERHOUSE location on the smaller channel (bottom opposite page) takes advantage of hard foundation, permits greater flood passing capacity at the main dam. Draft tubes are below water level but the openings to fish passages appear. Deck atop the substructure is at El. 55; tail water at extreme floods will rise to El. 53. The 30-ton gantry crane in front of the powerhouse superstructure handles stop logs for draft-tube outlets. At left, mounted on the El. 90 deck is the large gantry for handling intake gates. Lower deck carries the roadway across the south channel.

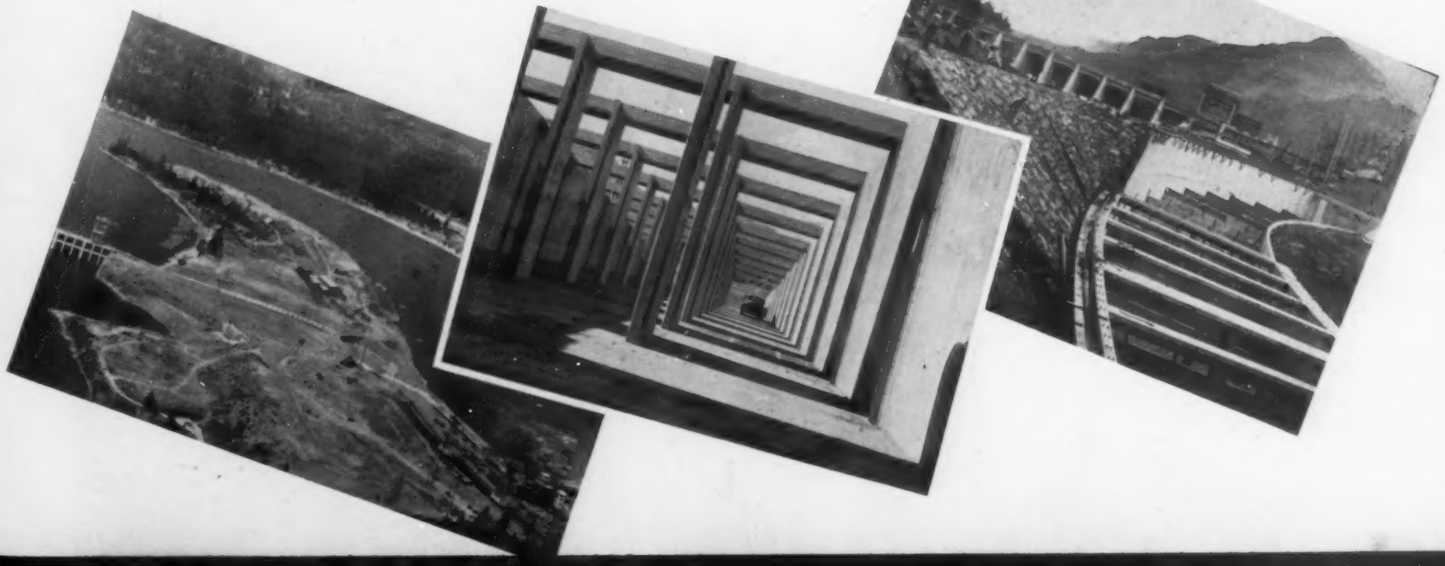
LOCK GATES (top right) measure 102 ft. from top to bottom, are the highest in the world. Each leaf weighs 525 tons, is equipped with air chambers to reduce under-water weight. Fabrication and installation were by Bethlehem Steel Co. Mitering gates of silicon steel, they are constructed of 44-ft. horizontal girders, framed with verticals and intercostals, faced with plain and buckle plates.

PASSAGEWAY for ocean going vessels is afforded by the lock's clear dimensions of 76x500x26 ft. at ordinary low water. At normal pool level, maximum lift will be 66 ft. from El. 6 to 72. Four 7x11.5-ft. tainter valves, two above, two below, take and release water, connection to the lock chamber being through 41 ports in the chamber floor. Normal time for operation is 15 min., control being from houses at either end of the lock. Gate operating machinery is located in the lock wall and consists of gear & sector actuating a strut to the gate. Motors, furnished by Century Electric Co. are 480-volt, 10-hp. on low speed, 30 hp. on high.

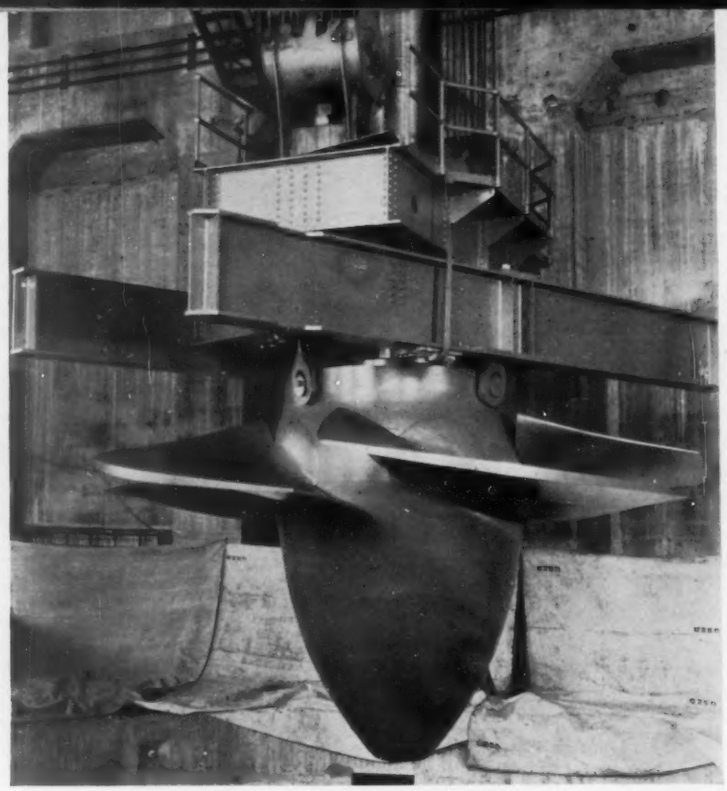
INSPECTION TUNNELS run lengthwise through the full length of the main dam. The one at right is at El. -36.

FISHING constitutes so valuable an industry to the Northwest that $7,000,000 was invested in fishways, to allow salmon to accomplish their upstream pilgrimage. The system (below) embraces three sets of ladders and three double fish locks. These include locks at either end of the main dam and south of the powerhouse, ladders on the Washington shore and Bradford Island. Ladder width is 40 ft., pools 16 ft. long with 1-ft. differences in elevation. Fish lifts are essentially the same as a navigation lock. A chamber measures 20x30 ft. Collecting systems extend across the draft tubes and removable ones are placed at the two end gates of the main dam. Collecting systems are passages designed to produce water currents which will attract fish to the lifts or ladders. Bottom left shows the Bradford Island ladder, legs from below the main dam and the powerhouse leading to the pool above the powerhouse. Center and right are close views of the Bradford Island ladder.





TURBINES



BIGGEST KAPLAN TURBINES ever built are those at Bonneville. Specifications require performance through wide ranges of head and flow. Specified were heads varying from 30 to 69 ft., maximum capacity of 66,000 hp. at 50-ft. head passing 12,200 sec.-ft. Normal capacity of 60,000 hp. can be secured at any head above 47 ft. Over the past 30 years weighted mean head would have been 54 ft., minimum head 40 ft. When tailwater rises during flood, pool elevation will be raised from normal El. 72 to maximum El. 82.5. With 550,000 sec.-ft. flowing in the river, tailwater will be at El. 35, the pool at maximum. Full turbine capacity can be held until the flow reaches 800,000 sec.-ft., but beyond this point the opening of spillway gates raises tailwater and head is lost. The Kaplan units meet changes in head and load by adjustment of blade angle and gate opening. S. Morgan Smith Co. furnished the units.

RUNNER ASSEMBLY (top right) ready for placement. Weight of turbine moving parts is 275 tons; weight of complete turbine, including moving and embedded parts is 900 tons.

TURBINE PIT (top left) of Unit No. 1, showing draft tube and draft tube liner in place. The throat ring rests on top of this foundation.

WICKET GATES appear in the next view. Diameter of the turbine runner is 23 ft. 4 in., that of the draft tube 23 ft.

SCROLL CASE and speed ring (third view) marked new practice. Because of size, draft tubes are concrete, contain concrete splitters with steel noses which split the tube in quarters to reduce surges. Speed rings were arc welded.

INTAKES (fourth view) are first divided into three equal passages, one passage being further divided as shown so that water in the scroll case reaches the turbine from five passages.

GATES (fifth view), vertical steel lift type, are used to close off intake passages. There are three per intake bay, one for each passage, two being shown.

KAPLAN HUBS (bottom) are of cast steel, carry five cast-steel blades, each blade weighing 13 tons. The hub contains blade operating mechanism immersed in 3,000 gal. of lubricating oil. One of the two initial units carries machine-finished blades.

TWO MAIN UNITS (below left) set a record for size, exceeding those of Boulder in physical, but not electrical, dimensions. Furnished by General Electric Co., they were erected in place at $572,440 each. Practical limits of water wheel size and selection of 13.8-k.v. generating voltage set design. Rating is 43,200-kw., 0.9-p.f., 13.8-kv., 75-r.p.m., 3-phase, 60-cycle. Main exciter (375-kw., 250-volt) and pilot exciter (17-kw., 250-volt) are direct connected. Above the exciters are oil pipes to Kaplan head and permanent magnet generator for governor drive. Overall height (coupling flange to top) is 40 ft., outside diam. 48 ft. Shaft diam. is 40 in. with 15-in. axial hole accommodating oil lines to Kaplan head. Windings are Class B insulated; ventilating system is conventional inclosed type. Gas equipment is supplemented by water nozzles to extinguish fires in windings.

POWERHOUSE (top) built for two units measured 67x233 ft. Two turbine pits were poured with the structure. Other units will be added to the north.

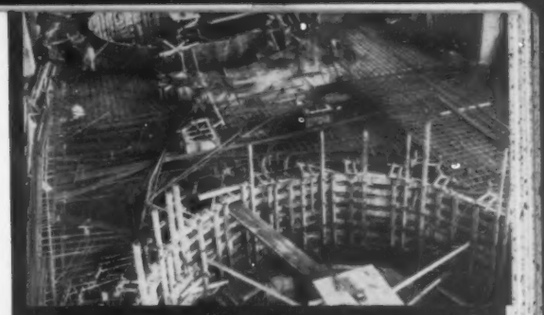
ROTOR (second) and generator rotating parts in place weigh 775,000 lb., have 113,000,000-lb.-ft.-squared flywheel effect. Here field coils are being assembled.

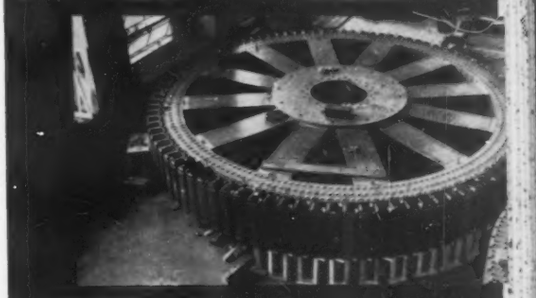
HANDLING (third) was by two 300-ton overhead cranes furnished by Pauling & Harnischfeger Co. This is the rotor for unit No. 1 being lowered into place.

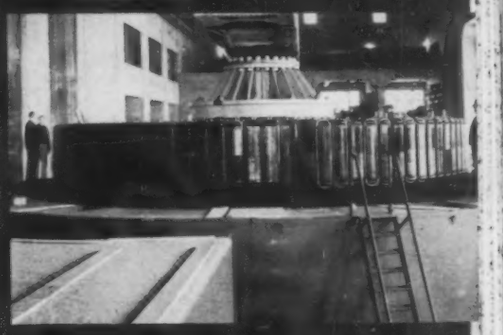
BEARINGS (fourth) accommodate overspeeds of 288-per-cent. normal. Shown is the main thrust bearing assembly ready for placement. Two guide bearings, upper and lower, take care of overspeeds.

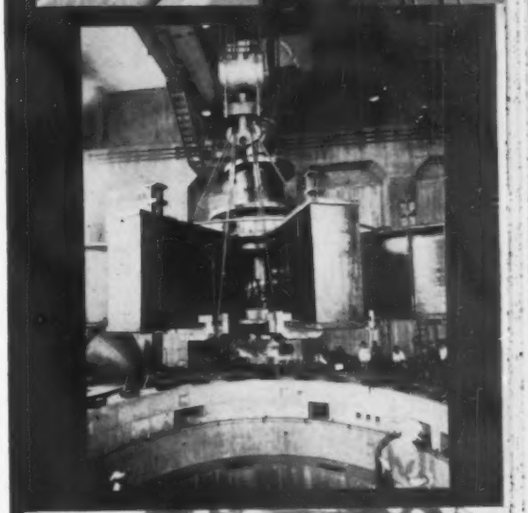
STATOR (fifth) installed in the pit of unit No. 1. Thrust bearing also has been placed.

THRUST BEARING (bottom) carries 50-per-cent. more load than any previously built. In operation it carries 2,843,000 lb., about half being weight of moving parts, other half the thrust of water at 69 ft. head. It is the G. E. Co.'s spring-supported type.

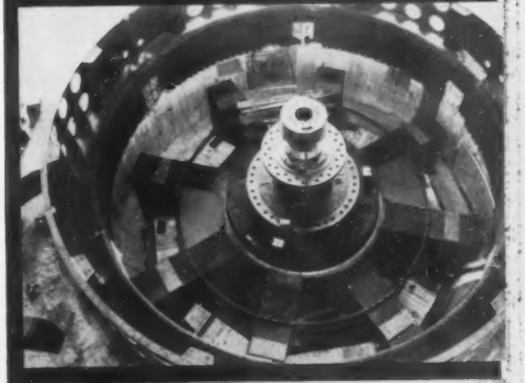


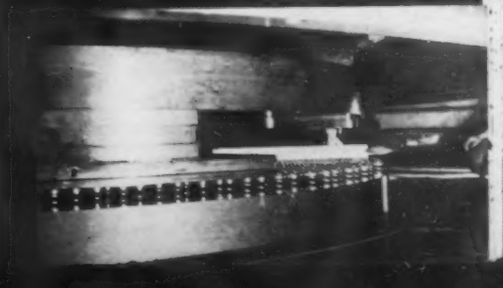






GENERATORS



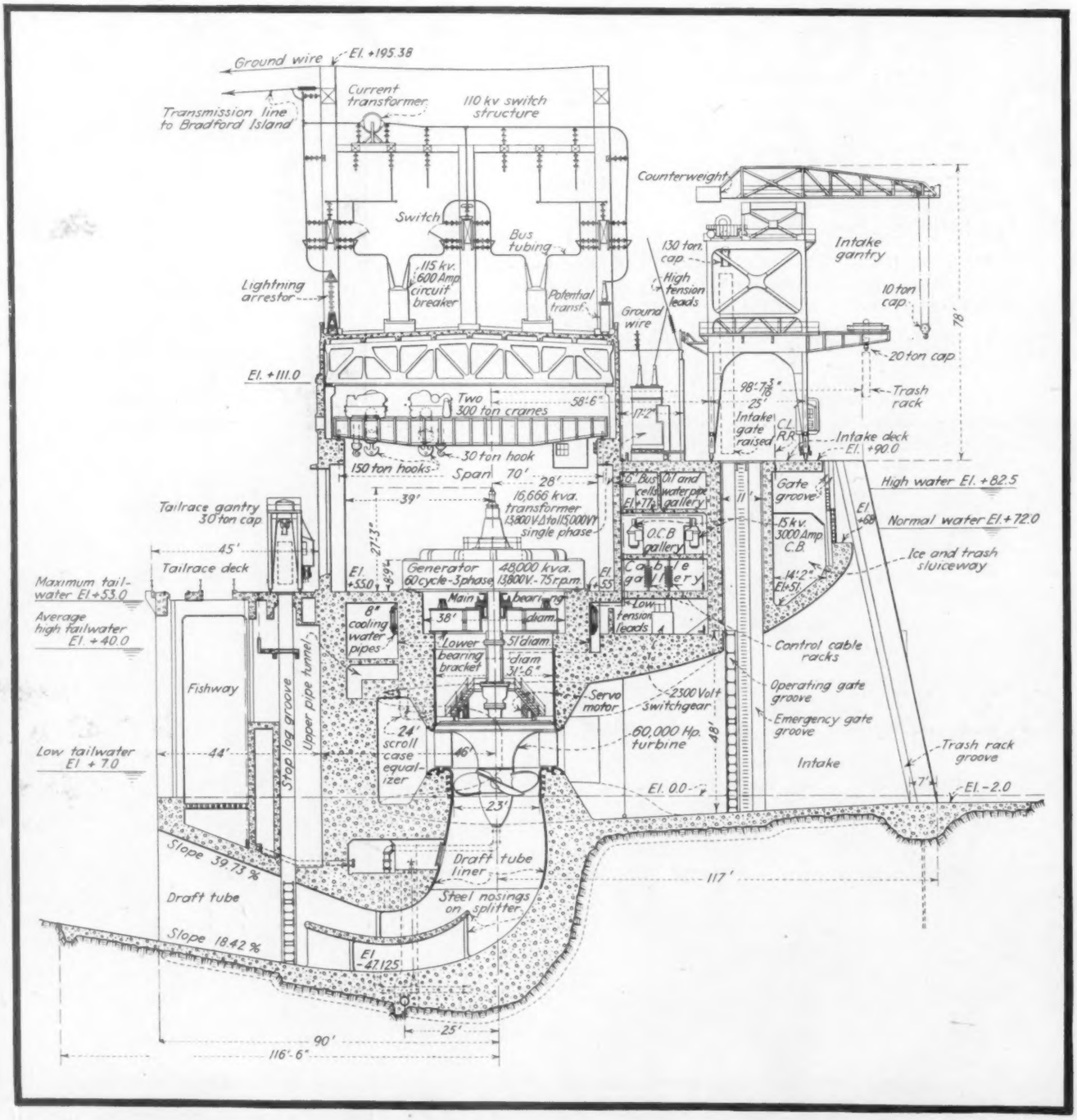


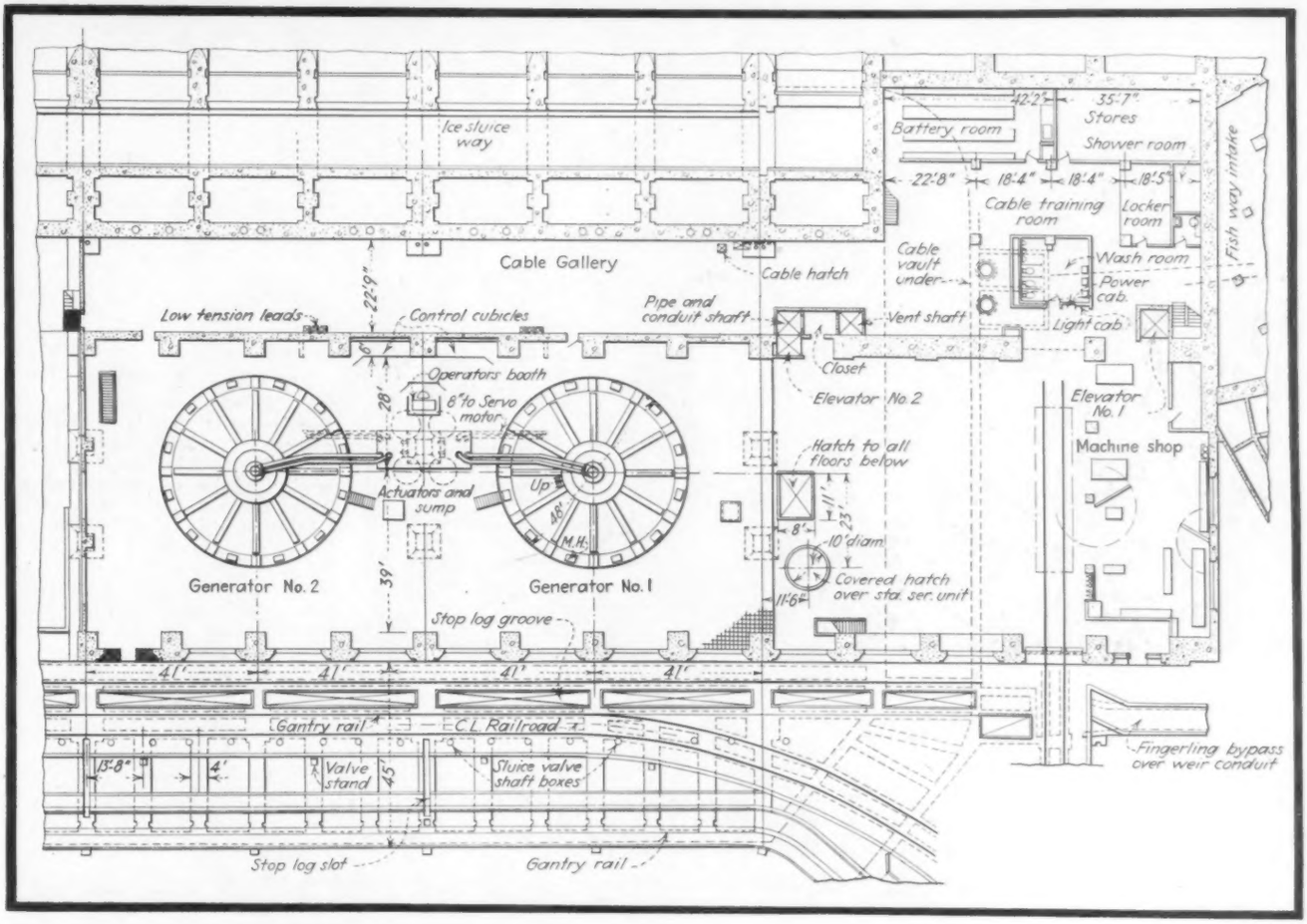
POWERHOUSE

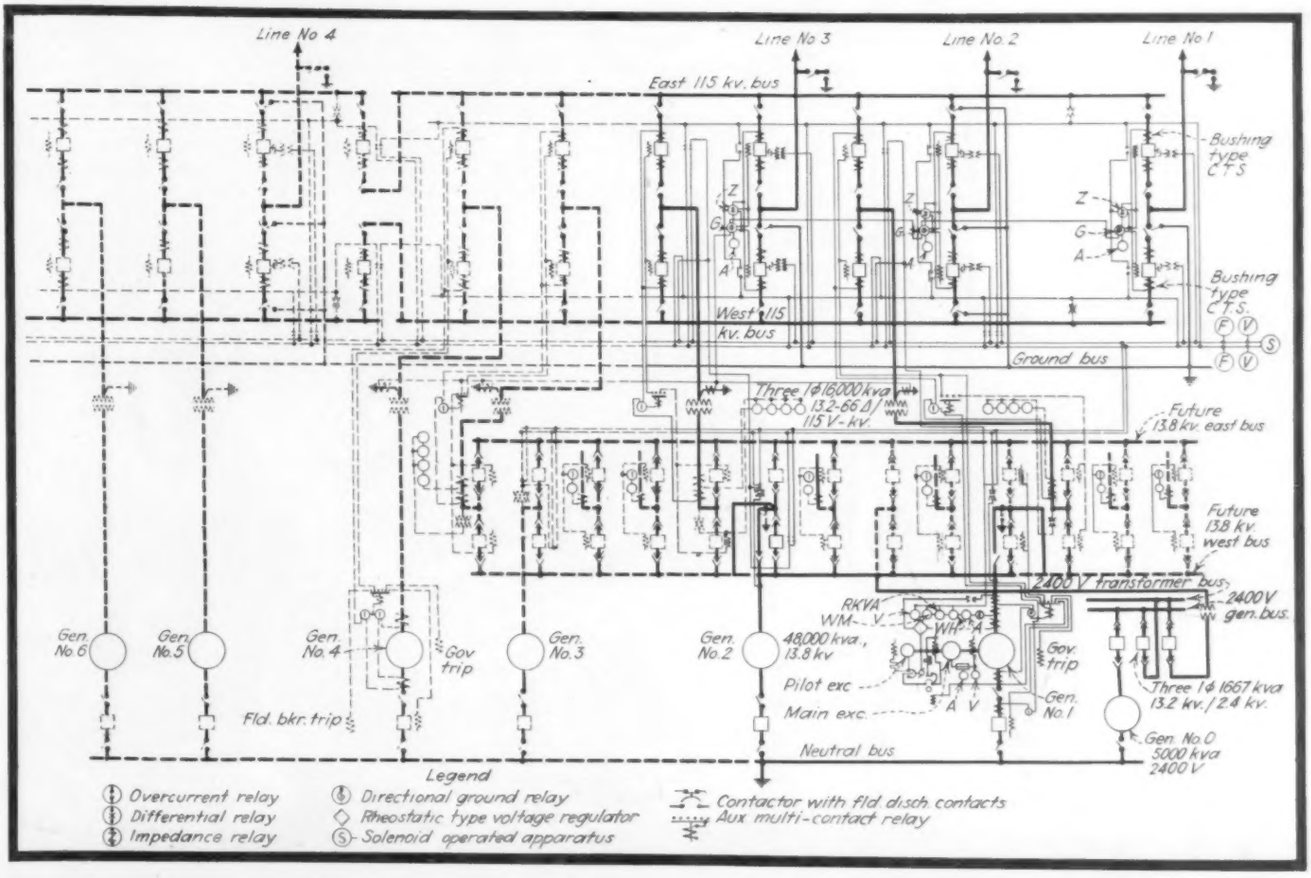
ELEVATION (below) is of a powerhouse section looking north. Draft tubes, scrolls and intakes are of reinforced concrete. Draft-tube splitters and steel liners are indicated. Space marked "fishway" above draft tube is one of the collecting systems for the Fish ladders.

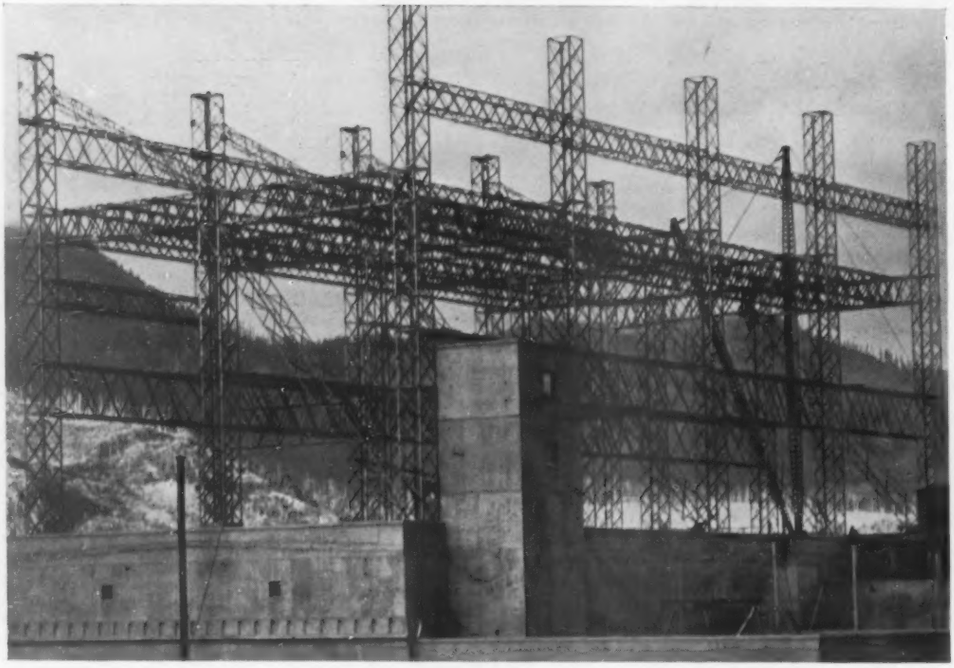
PLAN (top opposite page) is of initial powerhouse with two units, upstream being at top. Skeleton structure extends to the left for additional units. Dimensions of the two-unit structure are 207x280 ft. Entire floor is designed for 1,000 lb. per sq. ft. live load.

ELECTRICAL SCHEME (bottom opposite page) includes a generator bus to provide for serving some load at generated voltage. Initial equipment is a single bus extending over seven circuit breaker positions: two generators, two main transformer banks, three feeders.




Ice sluice way
Cable Gallery
Low tension leads
Control cubicles
Pipe and conduit shaft
Cable hatch
Cable vault under
Vent shaft
Battery room
42'2"
35'7"
Stores
Shower room
22'8"
18'4"
18'4"
18'5"
Cable training room
Locker room
Wash room
Power cab.
Light cab.
Fish way intake
Closet
Elevator No. 2
Elevator No. 1
Machine shop
Operators booth
8" to Servo motor
Actuators and sump
Up
48"
M.H.
Hatch to all floors below
8'
10' diam
Covered hatch over sta. ser. unit
11'6"
Generator No. 2
Generator No. 1
Stop log groove
41'
41'
41'
41'
Gantry rail
C.L. Railroad
Valve stand
Sluice valve shaft boxes
Fingerling bypass over weir conduit
Stop log slot
Gantry rail


Line No. 4
Line No. 3
Line No. 2
Line No. 1
East 115 kv. bus
West 115 kv. bus
Bushing type C.T.S.
Ground bus
Three 1-16000 kva 13.2-66 Δ / 115 Y - kv.
Future 13.8 kv. east bus
Future 13.8 kv. west bus
2400 V transformer bus
2400 V gen. bus
RKVA
WM
WH
Gen. No. 6
Gen. No. 5
Gen. No. 4
Gen. No. 3
Gen. No. 2
48,000 kva., 13.8 kv
Gen. No. 1
Gov. trip
Pilot exc.
Main exc.
Fld. bkr. trip
Neutral bus
Three 1-1667 kva 13.2 kv. / 2.4 kv.
Gen. No. 0 5000 kva 2400 V
Legend
Overcurrent relay
Differential relay
Impedance relay
Directional ground relay
Rheostatic type voltage regulator
Solenoid operated apparatus
Contactor with fld. disch. contacts
Aux. multi-contact relay



SWITCHING STRUCTURE (left) for 115 kv. was erected atop the powerhouse as suitable ground site did not exist. Bethlehem Steel Co. undertook the job. Two rigid buses employ tubular copper conductors. Duplicate, vertically-mounted circuit breakers were furnished by Westinghouse. Group-operated disconnects for control of two banks of step-up transformers and three transmission lines were furnished by Pacific Electric Mfg. Co.

TRANSFORMERS...
...SWITCH GEAR

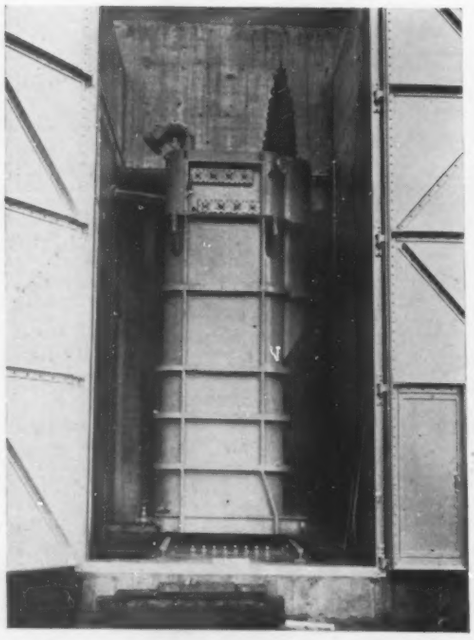
STEP-UP transformers (bottom left) are by Wagner Electric Corp. Three per bank for each generator, they are rated: 16,000-kva., 13.2-kv.delta/, 66-kv. delta/115-kv. Y, single-phase, 60-cycles. Each is located in a separate cell, open at top only.

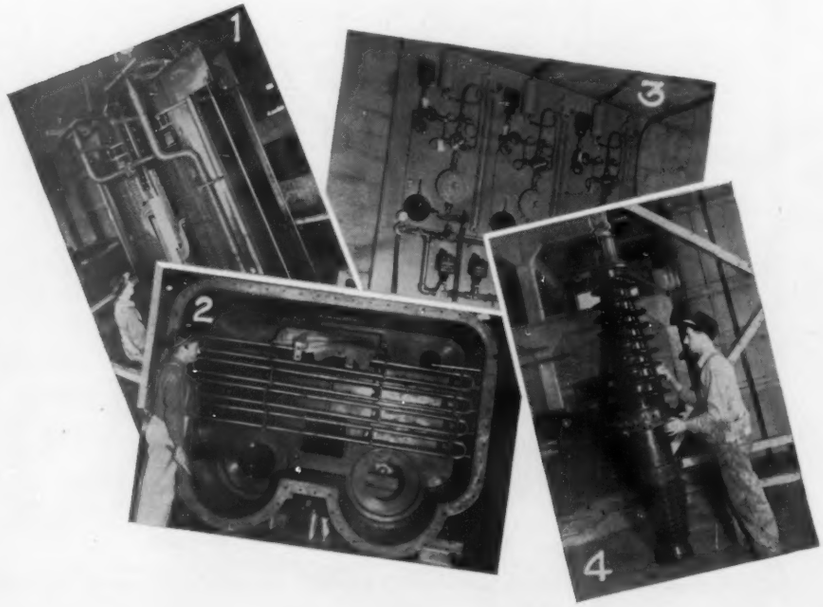
Fig. 1 (below)—Core of a main transformer. All are oil-immersed and were subjected to usual tests plus impulse tests for the 16,000 kva.

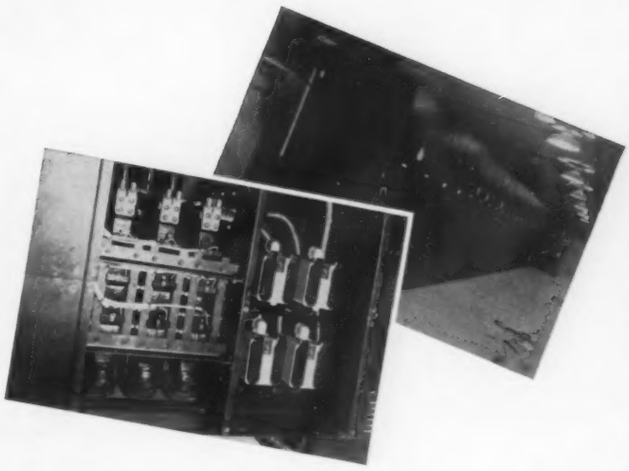
Fig. 2—Water cooling system located atop a main transformer.

Fig. 3—Equipment for regulating pressure of nitrogen with which the transformers are filled. One such regulating unit is used for each bank.

Fig. 4—Dimensions of a main transformer bushing can be judged from this view.



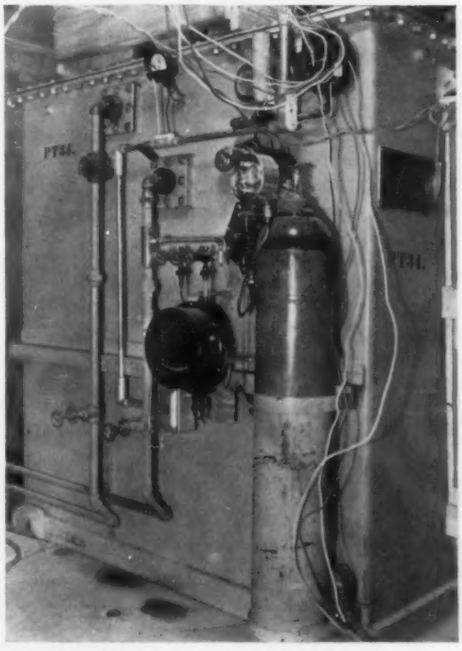


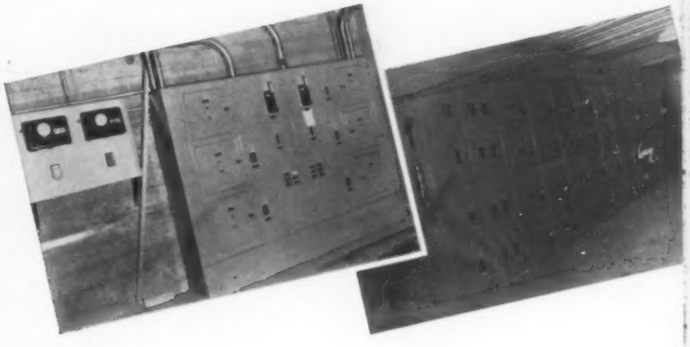


2,400-VOLT SERVICE is through a 5,000-kva. bank of Moloney transformers. The three are rated: 1,667-kva., 13.8-kv., 2,400-volt, single-phase. These supply the station service bus or step up when the house unit is paralleling the 13.8-kv. bus.

SWITCHGEAR (upper right) for 2,400 volts is by General Electric. One continuous metal-clad structure includes buses, taps and circuit breakers insulated for 15,000 volts. Made up of fifteen bus positions and one induction regulator assembly, it isolates each position in a metal compartment containing 3-phase buses, oil circuit breakers, instrument transformers and accessories. From it, 2,400-volt circuits run to the dam, island, village, and light and power transformers for the powerhouse.

REARVIEW (top center) shows a section of the switchgear with current and potential transformers for the station-service generator.

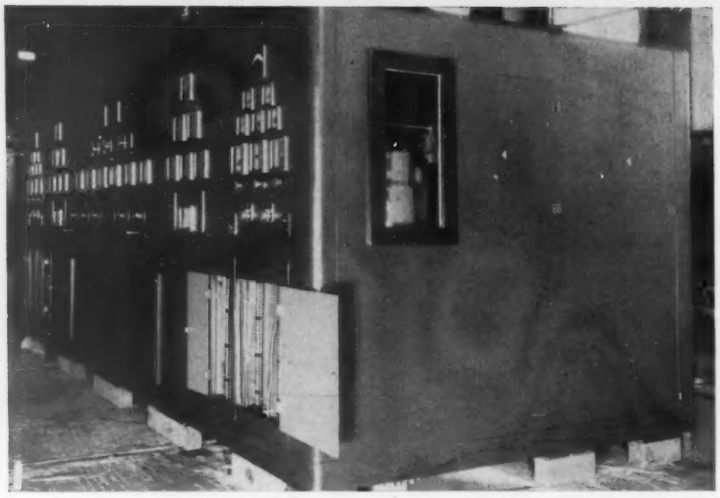


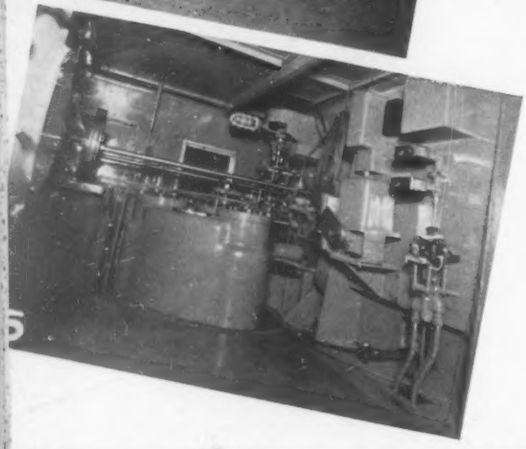


480-VOLT service for powerhouse auxiliaries and lock operation is supplied through a bank of two 1,000-kva., 2,400/480-volt, 3-phase, 60-cycle Moloney transformers (above).

CONCENTRATED in the cabinet above right is control of all 480-volt, 3-phase power for station service, navigation lock and fishways. The unit was furnished by Roller Smith Co. Distribution is through twenty principal feeders and twelve sub-feeders. One of several 480-volt distribution centers by Cutler-Hammer, Inc., is shown above at center. Circuit breakers on the supply sources, bus tie and principal feeders are air-break, solenoid operated, those on sub-feeders are air-break, manually operated.

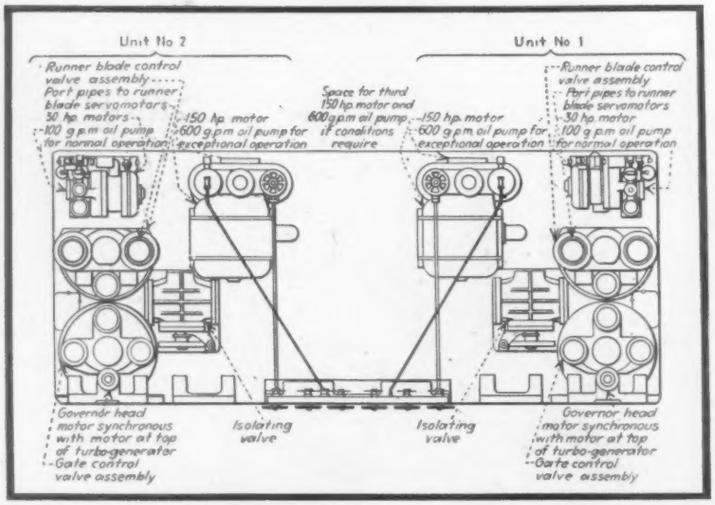
LIGHTING at 110/220 volts is supplied through the transformer bank shown at right. Rated 2,400/220-110 volt, single-phase, 60-cycles, the transformers were supplied by Wolff Electric Works.

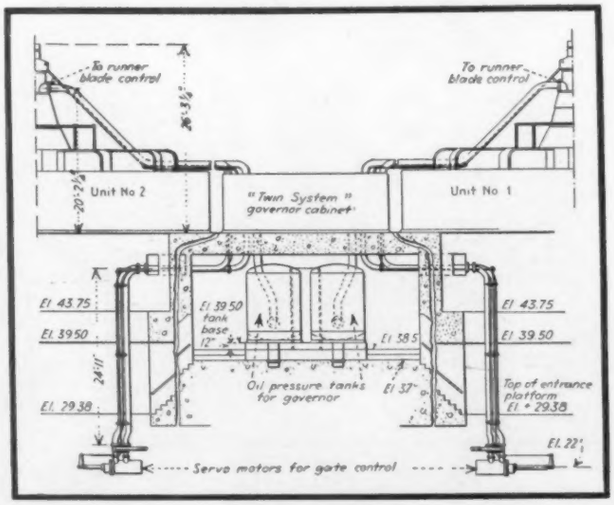


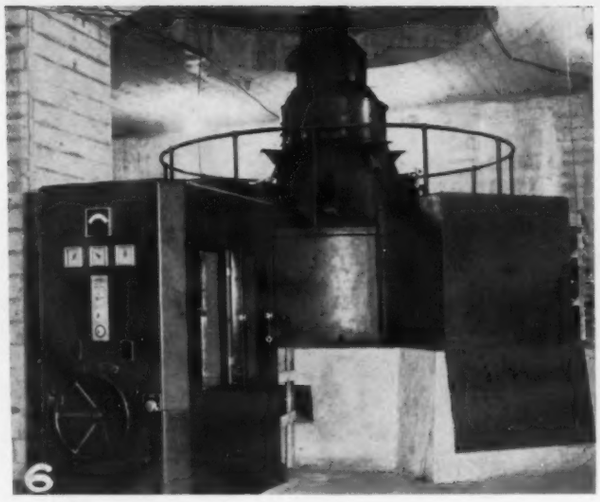


GOVERNORS

To keep Bonneville's machines performing under wide variations in head, on any type of system with unpredictable load, Woodward Governor Co. built the world's largest governor assembly. Within the single cabinet (1) are twin governors for the two main units. Aside from its size, the unit is noteworthy for its adjustable characteristics, particularly speed droop, and for quick response. Within the cabinet are two governor head motors, synchronous with units atop the main generators, two 30-hp. and two 150-hp. motors for pumping oil. Important auxiliaries include the automatic net-head-level gate limitors, which reduce gate openings when net head exceeds that for maximum generator output, and an automatic device which automatically and intermittently applies brake shoes to the turbine after turbine gates are completely closed and the generator breaker open. Outside the cabinet are the permanent magnet generators for driving the governor head motors, two blade- and two gate-restoring connections, two sets of blade and two of gate servomotor port oil piping and four pressure tanks. Two 10-in. pipes (3) carry oil to the Kaplan head. Oil-pressure tanks (4) are mounted below the cabinet. Inside view (5) shows the large motor for pumping under exceptional conditions in left foreground, the runner blade control valve assembly rising in back center. Drawings (2 and 2a) indicate the arrangement.

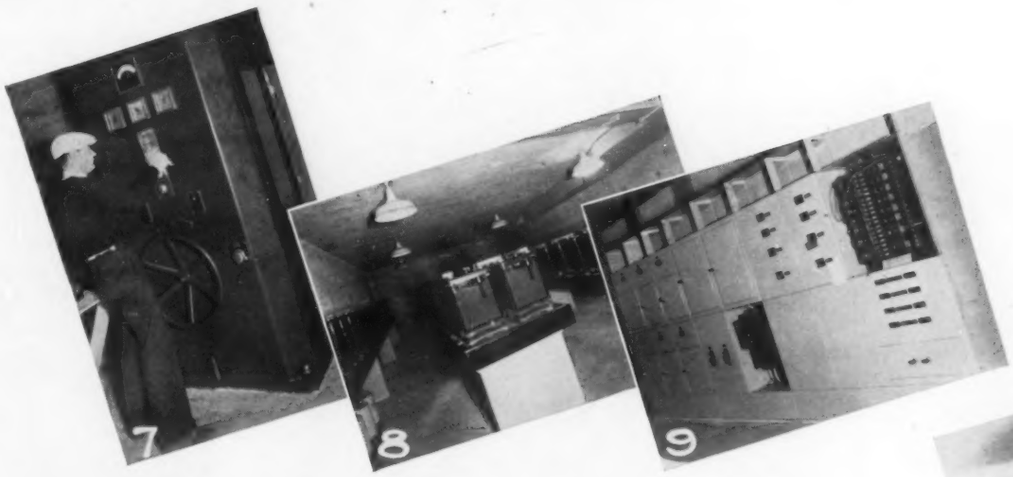

Unit No 2
Unit No 1
Runner blade control valve assembly
Port pipes to runner blade servomotors
30 hp. motors
100 g.p.m. oil pump for normal operation
150 hp. motor
600 g.p.m. oil pump for exceptional operation
Space for third 150 hp. motor and 600 g.p.m. oil pump if conditions require
150 hp. motor
600 g.p.m. oil pump for exceptional operation
Runner blade control valve assembly
Port pipes to runner blade servomotors
30 hp. motor
100 g.p.m. oil pump for normal operation
Governor head motor synchronous with motor at top of turbo-generator
Gate control valve assembly
Isolating valve
Isolating valve
Governor head motor synchronous with motor at top of turbo-generator
Gate control valve assembly





STATION POWER

For house service, Electric Machinery Mfg. Co. furnished the unit at left (6) at $61,473, erected in place and, like main units, subjected to complete tests including short-circuit and overspeed. It is rated: 4,000-kw., 0.8-p.f., 2,400-volt, 257-r.p.m., 3-phase, 60-cycle, with direct connected main and pilot exciters. Although installed for emergency and peaking it was turned over in the fall 1937, continued in service into 1938, carrying lighting and construction loads. It is connected to a separate bus which may be paralleled with the main 2,400-volt bus through a bus-tie breaker. Located on the 37-ft. level it is surmounted by a circular hatch leading to the main generator room. Its governor (7) (also Woodward) is adjacent, is similar to equipment for the main units except that Kaplan blade angles are controlled manually.



MISCELLANEOUS

DIRECT CURRENT (8) is supplied from a 250-volt Gould battery consisting of 120 17-plate cells in sealed glass. These float at constant voltage across a motor generator set furnished by Electric Products Co. Battery switchboard (9) was furnished by Cutler Hammer, Inc.

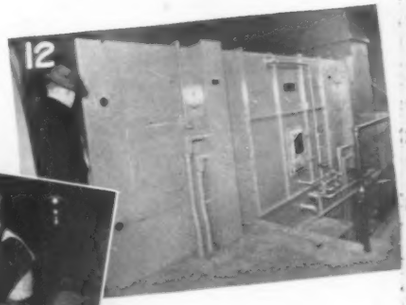
MAIN CONTROL ROOM (10) is 20 ft. above generator floor with a large window overlooking it. The room is cove lighted and sound proofed. Equipment, furnished by Westinghouse, centers around the main board which was installed over the arc-opening which can be discerned, boarded-over, in the floor. This is flanked by the station service board and the graphic instrument board. Control circuits (11) leave the 2,400-volt switchgear in conduit.

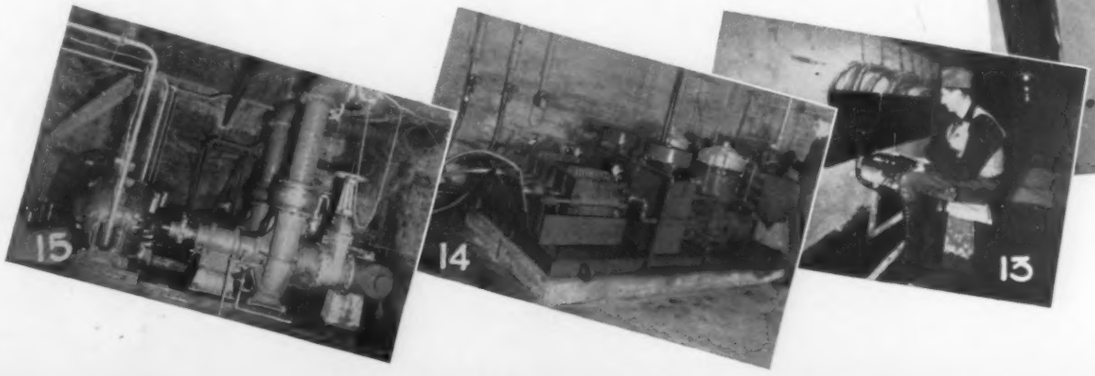
ELECTRIC HEATING connected load is 1,000 kw. Main control room, upper powerhouse offices and lower station service rooms are air-conditioned. One of two air-conditioning units is shown (12). Containing 180 kw. in strip heaters, it was furnished by Electric Air Heater Co.

STRESS AND STRAIN on the main dam (13) is read periodically, instruments having been imbedded in the concrete. Readings are now taken from a permanent panel in the control house.

OIL PURIFYING is accomplished by De Laval equipment (14) furnished by Gould Mfg. Co.

PUMPS for unwatering (15) are located in the pump sump at El. -58. Bingham Pump Co. were the manufacturers.





PERSONNEL

Portland Division, Corps of Engineers, U. S. Army were responsible for design and construction of Bonneville project. As division engineer, Colonel T. M. Robins (above left) was in charge when the project started and retained supervision until its completion. With the establishment July 1, 1937 of Bonneville District at Bonneville, Major T. D. Weaver (above center) was appointed district engineer and became district head of the engineering and operating organization at the dam. Captain Colby M. Myers (above right) was resident engineer. Civilian engineers connected with the Army's Portland Division figured prominently on the job. At left (top to bottom below Col. Robins) are: C. I. Grimm, head engineer, who as chief civilian engineer was directly in charge when the project was started; A. E. McKennett, principal engineer, closely connected throughout the job, and B. E. Torpen, senior engineer on construction.

Above are an Army group who visited the project during construction. Left to right are Major-General E. M. Markham, chief of Army engineers; Col. Robins; Lt. Col. C. F. Williams, who was in direct charge of the first part of the work, and Capt. J. S. Gorlinsky, former resident engineer. At right are F. M. Lewis, electrical engineer (left) and (right) P. L. Heslop, mechanical engineer. In charge of design were C. C. Galbraith, powerhouse and plant, and L. E. Kurtichanof, electrical. Consultants included L. F. Harza and J. P. Hogan, structural and hydraulic, and G. W. Hamilton, electrical. Below, looking north at permanent quarters, dam is upstream to the right.

"POWER IS THE MASTER KEY"

says a San Francisco journalist, **to the industrial development of the 11 Western states. He points to the interlocking grid of power lines which now covers the West, to the substantial additions which are being made to electrical generating facilities. He argues that low-cost electric power, the cheapest anywhere, will result from this combination. Electric power will bring economic prosperity to this region** ... *And*

HUBBARD POLE LINE HARDWARE WILL SIMPLIFY THE JOB!

Any electrical power expansion in the 11 Western states naturally includes Hubbard Hardware. It is the line builders' assurance that service will be uninterrupted and dependable.

Hubbard & Company, as an integral part of the Western electrical industry, is proud that it is in a position to cooperate fully and serve the industry in this great development.

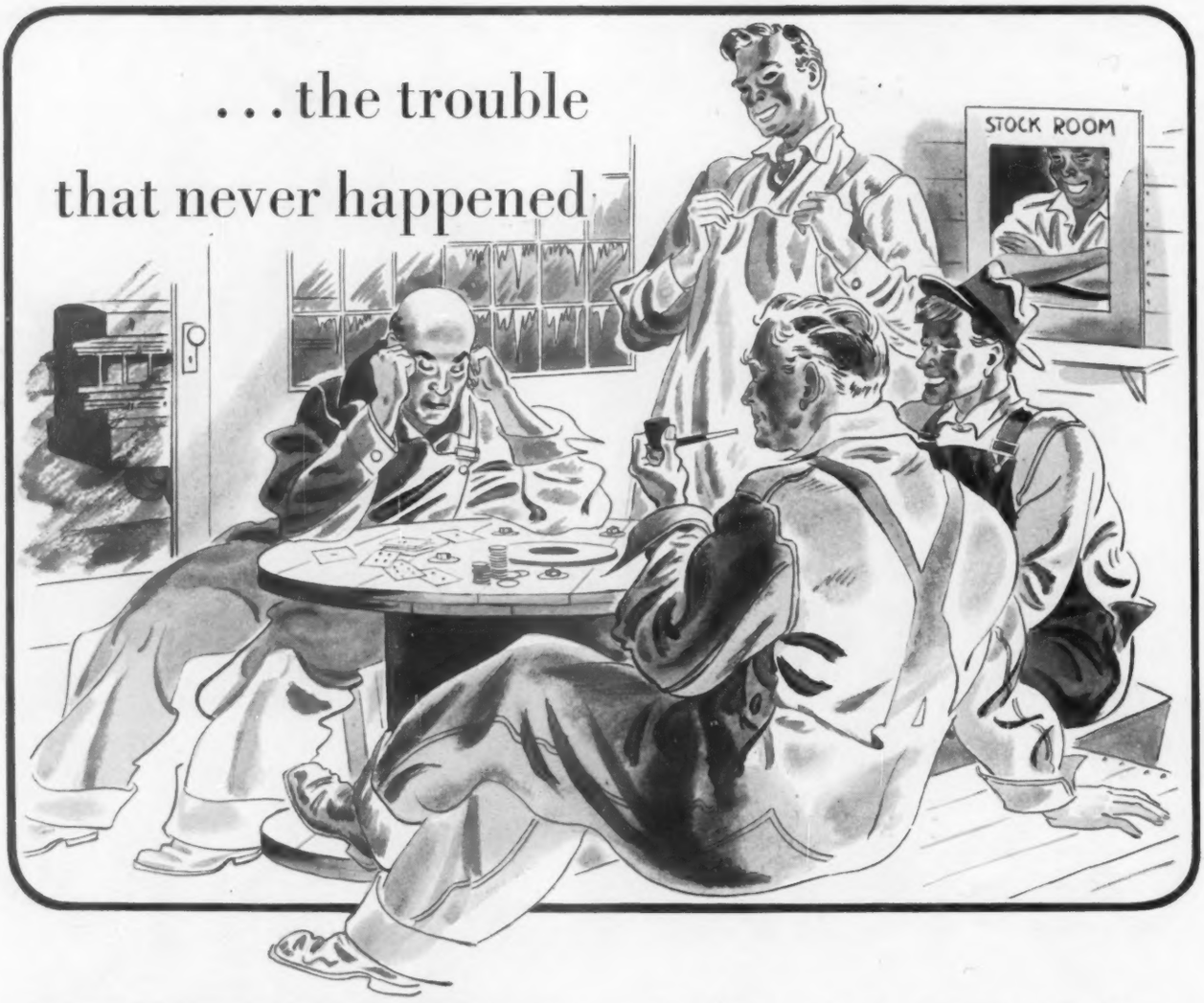
Hubbard and Company is constantly alert to the needs of the electrical industry. Its factory at Oakland, California, is equipped to furnish a complete line of distribution hardware and construction specialties that are reliable and of guaranteed quality.

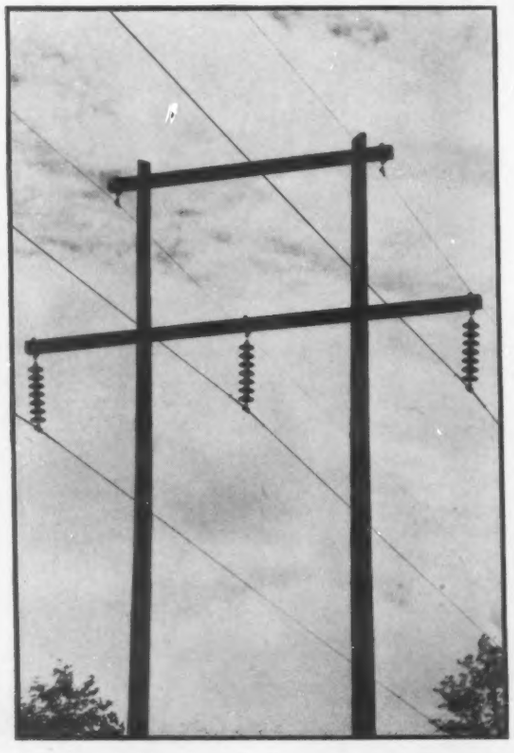
Its distributors, the General Electric Supply Corp. and the Graybar Electric Co., are conveniently located for prompt, efficient delivery of Hubbard Pole Line Hardware and Peirce Construction Specialties. To solve your special problems we invite you to call upon our experienced engineering department.

HUBBARD

Hubbard and Company

OAKLAND, CALIF. § **CHICAGO** § **PITTSBURGH**





PLENTY of trouble for Baldy. But none on the A.C.S.R. lines, so the little game he started, "to trim the pikers," lasted all night. He's had a rough going over.

You learn to expect a minimum of trouble when the conductors on your hi-lines and rural lines are Aluminum Cable Steel Reinforced; no need to have your gangs up all night waiting for trouble. Operating men everywhere report regularly that their A.C.S.R. lines have gone through serious ice, wind and electrical storms without injury.

To the following factors, considerable credit must go for the enviable performance of A.C.S.R. lines: the light weight and corrosion resistance of Aluminum, the high strength of steel, and the perfected system of vibration control. ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh, Pennsylvania.

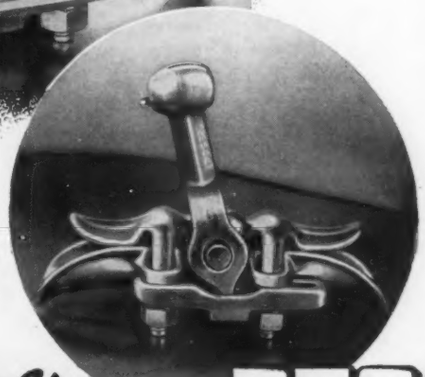
A·C·S·R

FOR RURAL LINE

FOR POWER TRANSMISSION

ALCOA

Special Treatment DEMANDED!



Illustrated — *Heavy duty trunnion type, slip clamp; forged to specifications. For use on a 220 K.V. line with A.C.S.R. and with armor rods.*

Where special treatment is demanded, BTC cooperates with insulator and utility engineers in forging to their specifications.

No matter how exacting, BTC can forge it.

If it's Hi-Line Hardware **BTC** *Can Forge It*

THROUGH YOUR INSULATOR MANUFACTURER ONLY

··· THE BREWER-TITCHENER CORP., CORTLAND, N. Y. ···

Why SWITCHES ON STATION POSTS ARE BETTER SWITCHES.....

Manufacturers and users of switching equipment have been quick to recognize Lapp Station Post superiorities. Features responsible for this outstanding insulator's rapid success include:

1. FREEDOM FROM PUNCTURE. The puncture path is practically the same length as the air flashover path—under excess voltage the insulator will always flash over rather than puncture.

2. ABILITY TO WITHSTAND ARCOVER. Multiple short petticoats protect the sturdy post body. Even when one or more petticoats are broken away, leakage and arcover distances are not appreciably lowered.

3. OPERATION UNDER DIRT CONDITIONS. Fog Type corrugations form a leakage surface open to the cleansing action of wind and rain. Many units installed in localities of severest industrial contamination and salt fog are now serving with complete satisfaction.

4. FREEDOM FROM CRACKING HAZARDS. One-piece design removes the *cause* of cracking (thermal movement between nested parts).

5. EXCEPTIONAL RIGIDITY. A strong one-piece post; hardware externally attached.

6. SAME STRENGTH INVERTED AS UPRIGHT. Underhung mounting of disconnects add to convenience of substation operation.

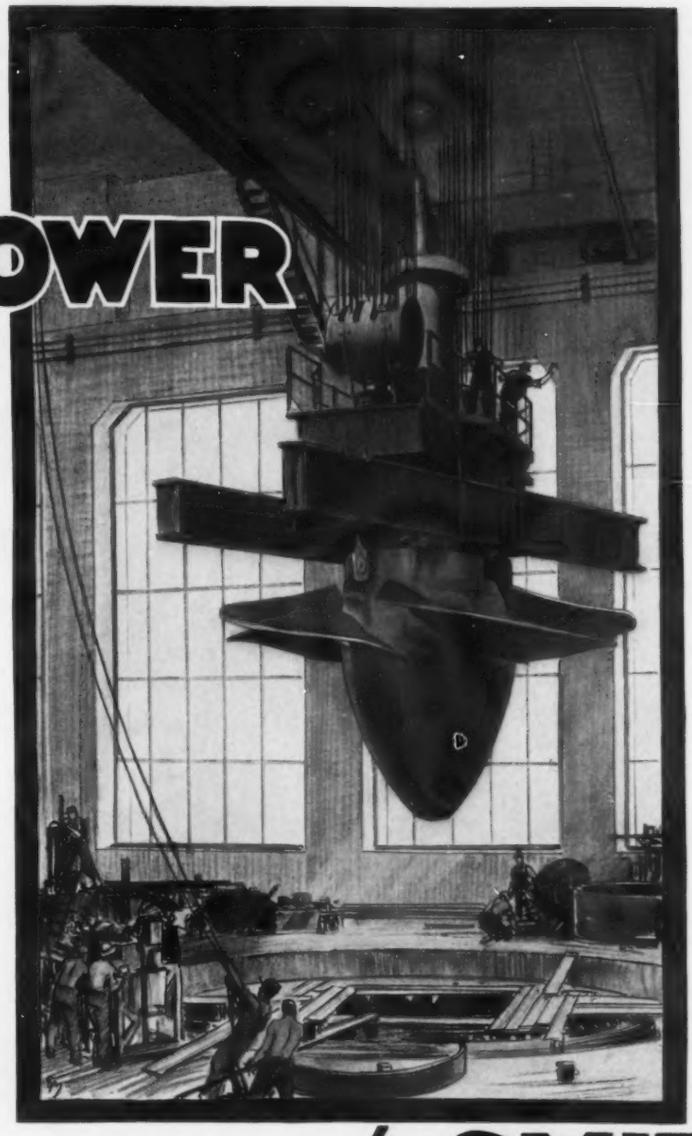
7. HIGH RESISTANCE TO IMPACT. Station Posts stand up under repeated and severe operation shocks.

8. SMALL DIAMETER. Permits closer spacing in switches. Saves size in station structure. Permits reinsulation of switches for higher voltages.

9. HANDSOME APPEARANCE. Generous chocolate brown porcelain columns with the beauty now recognized in functional design.

Lapp Bulletin No. 123 elaborates on Station Post and Line Post advantages. Write for your copy.

FIFTEEN TOP-FLIGHT MANUFACTURERS SUPPLY SWITCHES ON STATION POSTS



by SMITH At BONNEVILLE

SMITH-KAPLAN TURBINES, rated at 60,000 H.P. each —the highest-powered units of the Kaplan type ever built!

Selected because the Kaplan Automatic Adjustable Blade Turbine operates at the highest efficiency under the conditions of wide range of low heads and variable output which exist at Bonneville.

These turbines are interesting, also, because they are the first large units in which all but the moving elements were fabricated by welding—another instance of Smith pioneering—a large and unusual job but just another example of our ability to meet any water power requirement.

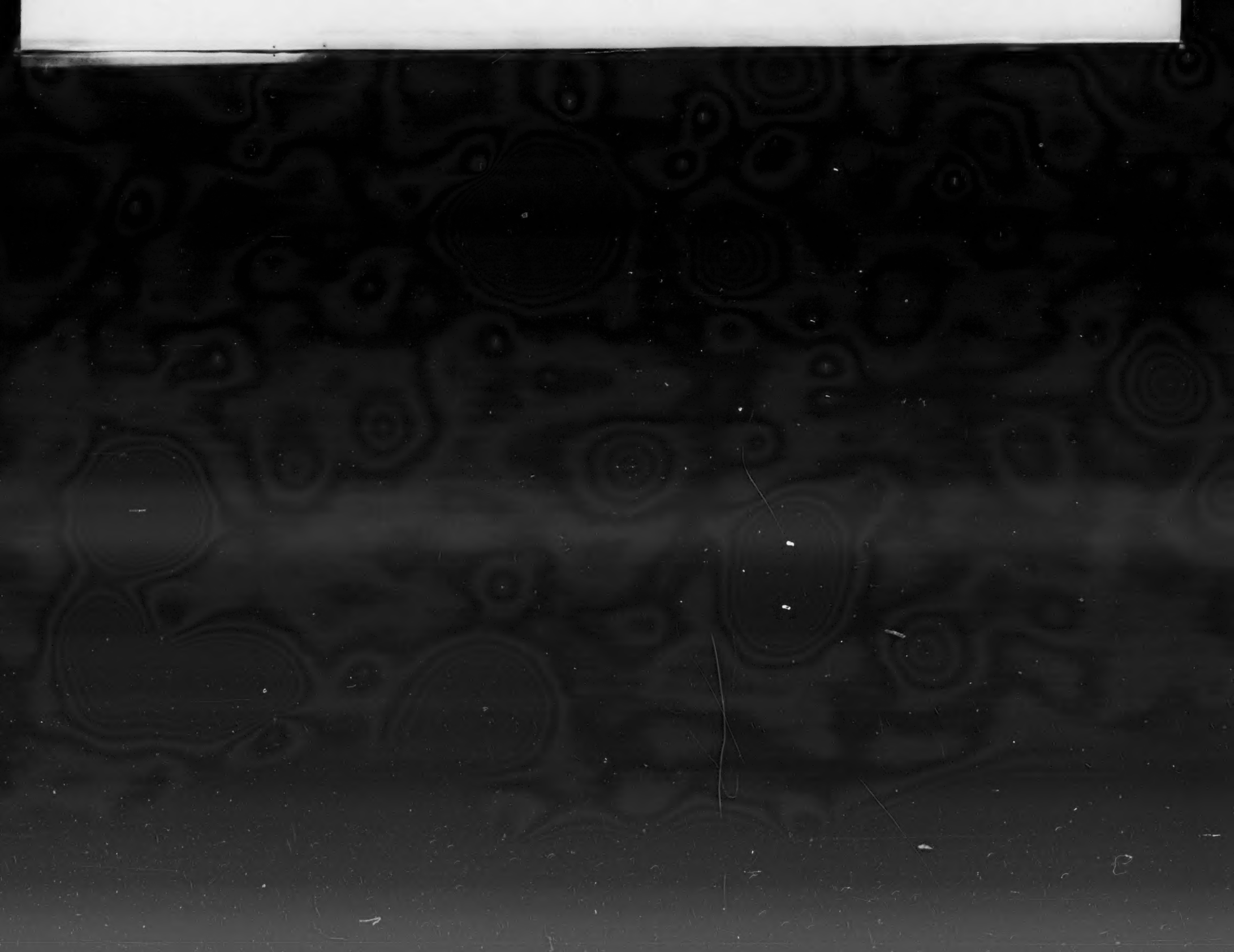
S. MORGAN SMITH COMPANY · · · YORK, PA.

GREATEST DIELECTRIC STRENGTH . . . . another high spot in

TODAY'S TREND TOWARD

POWER INSULATORS

PYREX is a Trade Mark and indicates manufacture by Corning Glass Works, Corning, N. Y.



Severe Ice Tests O.K.

Bonneville Switches—

Prove Extreme Ease of Operation Under Heavy Ice Conditions

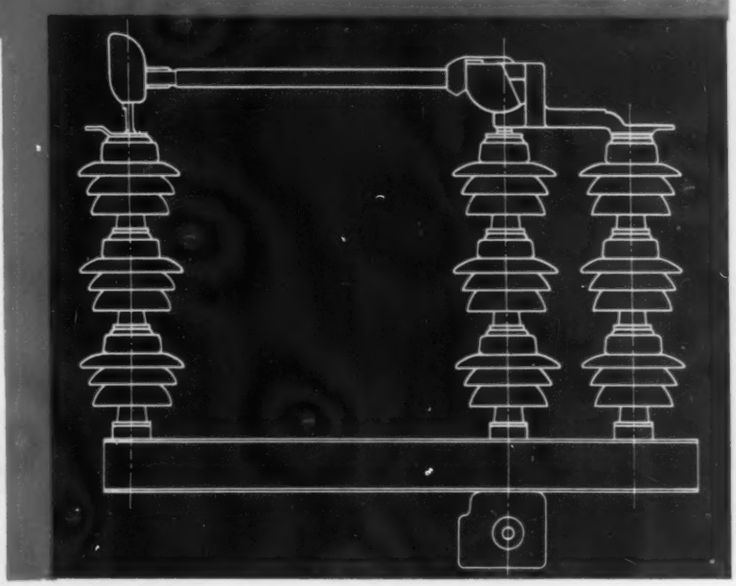
"Extreme ease of operation of air switches under severe ice probabilities must be assured," said Bonneville engineers.

Yet with few alterations in the design of a standard Pacific Electric switch, unusually-rigid government requirements were met.

Easy opening and closing under all weather conditions is guaranteed by the enclosed operating parts. The high-pressure contact mechanism prevents over-heating due to poor contacts, reduces repairs and saves money by eliminating frequent adjustments. The switch bases are of ample rigidity for keeping the switch in smooth-working alignment.

These switches are easy to install because all mounting details are carefully determined by Pacific Electric, and our 32 years of specialized experience knows how to safeguard against unnecessary field adjustments.

Pacific Electric air-break switches have been on the job for 30 years in some of the coldest states and in some of the iciest of foreign countries. You can rely upon them. So select the easy-to-operate, dependable Pacific switches. They are available in standard ratings from 7.5 kv. to 287 kv.



23 of the Type TP-1 three-pole, motor-operated, air-break switches, 115 kv., were recently shipped to Bonneville project by Pacific Electric.

Not Eskimos, but Pacific Electric engineers who made ice-house tests, at —20 degrees F., of specially-designed switches for Bonneville.

Pacific Electric Mfg. Corporation

Representatives in Principal Cities

5815 Third St., San Francisco **Dunes Highway, Gary, Indiana**

Giants of BONNEVILLE

WHATEVER may be said of the strength and durability of ancient towers and medieval castles can surely be expressed for the transformer illustrated here. For indeed, a tower of strength and power is this Giant of Bonneville — with its spires extending into a northwestern sky, and dwarfing the average man by its huge size, it can't help but impress or instill in one the feeling of the bigness and importance of this transformer, and the project of which it is a part.

The power transformer illustrated is one of a group of Wagner transformers installed at the Bonneville Power and Navigation Dam. These transformers are rated 16,000-kva, 115,000 volts, single-phase, water-cooled.

Wagner is proud of having been of service on this project and many others. Thousands of Wagner transformers now in service, attest to their reliability and dependability. Wagner engineers are always ready to lend their transformer knowledge to users in solving transformer problems. Consult us about your transformer needs.

Wagner Electric Corporation

Main Office
6400 Plymouth Ave., St. Louis, Mo.

Branch Offices West of the Mississippi

DALLAS DENVER KANSAS CITY
LOS ANGELES MINNEAPOLIS
PORTLAND SALT LAKE CITY
SAN FRANCISCO SEATTLE

TP 238-1Z

Selling the West

Bitter enemies get together to promote a Fair exhibit and bring business to the West

For the first time in the West's history there has been perfected an organization in which private power interests, public power interests, state government and federal government can sit down at one table and work out a problem together. That organization is The Industrial West, Inc., San Francisco, a non-profit corporation designed to promote, through an exhibit at the Golden Gate International Exposition, the expansion of industry in the eleven Western states.

As such, Industrial West, Inc., is sponsor of what is probably the biggest merchandising effort ever put forth by any company or group of companies in one fell swoop.

Father of the corporation is George W. Malone, San Francisco consulting engineer and former state engineer of Nevada who now carries the title of Industrial West's consulting engineer-manager. Working with him is as heterogeneous a group of men as you can find.

Sitting on the board are Frank Y. McLaughlin, assistant to the president of the exposition; George Creel, federal commissioner and leader of California's Democrats; R. E. Fisher, vice-president of P. G. & E.; E. F. Scattergood, general manager of the Los Angeles Bureau of Power & Light; John B. McColl, state senator; V. E. Breeden, R. H. Moulton Co.; T. B. Wilson, former president of Pacific Greyhound Stage Lines; Orla St. Clair, San Francisco attorney; H. E. Bauer, president of Southern California Edison Co.; R. K. Malcolm, Liberty Farms, and Isadore Zellerbach, president, Crown-Zellerbach Corp.

Thus merged on one board are Republicans and Democrats, private utilities and publicly-owned utilities and big business. But to make the picture even more significant: Of the $1,300,000 being spent by the corporation on the fair exhibit, $265,000 comes from the State of California, about $925,000 from the federal government and $100,000 from Western utility companies.

For the first time, then, opposing interests are working together. And the hope is that when the fair is over these interests will have learned that each side has its points and it is far better to cooperate if the common aim of all, the industrialization of the West, is to be realized.

Center of interest in the picture is, of course, the power industry. There are three utility men on the board of the corporation. Virtually all the Western utilities are contributing their share—by assessing themselves 3½c per meter on their lines. And on the power development of the West hinges the industrialization of the West.

Mr. Malone brings out this latter phase in a statement on the project. In his very first sentence he says: "The advent of low-priced power adjacent to the natural resources of the eleven Western states has made available to the people of the United States a 'new frontier' of development that may well form the basis of the industrialization of the West."

And further on: "There is steadily being brought about an inter-connected Pacific Coast power transmission system which will gradually merge into an all Western hook-up and will make available for industrial uses lower priced power than is now available in eastern manufacturing centers, including Niagara Falls.

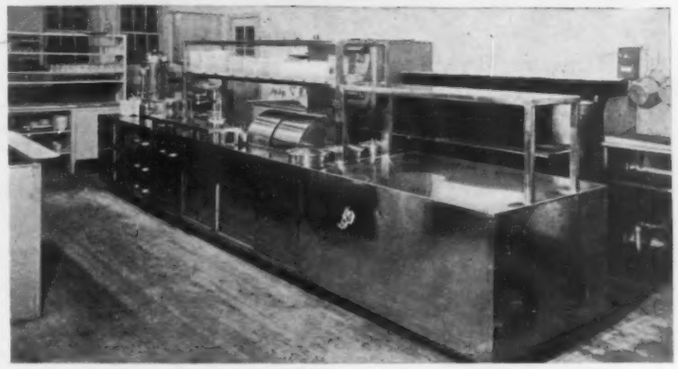
"According to the 1929 census the power supply in the eleven Western states amounted to less than 15 per cent. However, with the addition of 3½ million kw.-hr. of power, developed as a by-product of flood control and water conservation, together with contemplated additional private construction, the available power in this region will reach approximately 25 per cent of the entire supply in the United States by 1941. With the additional power employed in industry, through inter-connected systems, the population should make a comparable advance."

So the electrical industry stands to benefit by way of future sales.

But in subscribing whole-heartedly to the project, power companies have not been blind to one thing. The mere fact that they have contributed to a movement contemplating the advancement of the West will build up public good-will.

The job of effecting good-will and Western building is not, however, simple. The exhibit of Industrial West, Inc., in the exposition's Western States Building will be a giant relief map of

Before and After Pictures Provoke Commercial Sales



On the basis of these two pictures, showing a hotel kitchen before and after electrical modernization, and a testimonial letter, Washington Water Power Co. sent out to prospective customers a circular stating: "Electric cookery preferred for economy, cleanliness, efficiency, better food by Hotel Moscow," Moscow, Ida. Installation consists of electric range, bake ovens, hot tables, dish washer, mixer and air conditioning. The circular was one of a series on commercial cooking

the eleven Western states together with such dioramas, murals, etc., as are necessary to depict in greater detail the resources of the West. By means of this display the public will be informed of the West's natural resources, transportation and power facilities, markets and labor conditions.

To assemble this information will be the job of Mr. Malone and a small consulting staff. They will contact every source of knowledge in each of the states—the mining bureaus, agricultural departments, forest service, power companies, lumber companies, transportation utilities, colleges, economists, etc. From the information thus gathered, the staff will compile, correlate, check and arrange in comprehensive form all the important data. Then the material will be published in printed form and the map-makers, muralists and architects will go to work on the fair exhibit.

"This is the biggest undertaking in the world right now," Mr. Malone says. But almost invariably he comes back to the point at which he started: Assembling private and public ownership advocates on the board of directors of Industrial West, Inc., will do much to settle the differences of the electrical industry.

●

San Joaquin Shifts

Merchandising heads juggled as company goes after range sales

Successful generalship sometimes calls for shifting crack divisions to other positions on the line. Such a shift in headquarter's staff has been made by H. H. Courtright, manager of the Valley Electrical Supply Co., Fresno, merchandising division of San Joaquin Light & Power, in preparation for the year's campaign to hold existing load and build up new load.

The load-holding activity is by far the most significant of the company's plans. In order to carry this out the Valley company's salesmen who make range sales through dealers are given added responsibility, the number of home economists has been upped to four and a routine has been developed to keep range users satisfied as well as to develop prospects for new range sales.

Kenneth Hampton, formerly comptroller and in charge of the Fresno store, has been named director of the sales staff and dealer cooperation activity. As his assistant, Jack Collington, a veteran range salesman and supervisor, will have direct supervision of the range men.

Frank Easton, who was in charge of cooperation work, is in charge of the Fresno store with special supervision of Fresno dealer activity. Bob Downing, former head of retail salesmen and the wholesale division, is supervising distribution of the General Electric line which Valley Electric Co. handles.

The load-holding program—to which the sixteen range salesmen will devote a third of their time; the home economists most of their time—will revolve about the fact that of the 12,000 ranges in use on the line, about one-third are obsolete or in need of repairs. To remedy this situation the company will send to all customers with ranges using less than 200 kw.-hr. per month letters with stamped return postal asking for more information on the range. Those answering will be called on first; all others, subsequently. New recipes and methods of using the range will be demonstrated and an attempt will be made to sell the customer new ranges or at least new elements which will put the ranges in efficient working order.

The dealer program, Mr. Courtright feels, will be simplified by the company's close cooperation with appliance manufacturers. Manufacturers' distributors will be asked to call dealer meetings, at which the Valley company will present market analyses, new selling plans, etc., and set up in their stores and in the company's district offices displays with information telling where the displayed ranges can be purchased in each locality.

In most other respects the company's merchandising policy of the past few years will be continued. This means that the company will work through the Electric Appliance Society in holding campaigns; will make available to dealers its window display service, and will operate its two model stores at Fresno and Bakersfield on a non-competitive article merchandising basis, as a training school for merchants and salesmen and as a demonstration place to which dealers can bring their customers for further instruction on lines they do not carry.

●

Bulletin & Policy

Montana Power stops former competition with dealers

Distributed by Montana Power Co. last month was a brand new monthly appliance sales bulletin carrying news of a brand new sales policy adopted by the company "for the purpose of making it possible for dealers (in the territory) collectively to do a larger and more profitable percentage of the total business." Under the plan, the bulletin explained, the company had attempted to remove all elements which had made it difficult in the past for dealers to sell their appliances against company competition.

Details of the policy were announced in seventeen succinct paragraphs, gist of which follows:

Montana Power Co. will work toward a more widespread use of all its services by consistent promotion through the media of satisfied customers, publicity and advertising and the personal activities of well-trained home service advisors and new business representatives.

The plan purposes that the dealers sell the large majority of all appliances.

The company pledges itself to maintain prices—reserving the right to price damaged, obsolete or used merchandise.

When appliances are sold on the deferred payment plan, an adequate carrying charge will be added to the cash selling price. Items selling for less than $5 will be sold for cash only—30-day payments being considered cash. Exceptions may occur during special campaigns. Down payments will at least equal 10 per cent of the selling price, with the time payment period limited to a maximum of 24 months.

Where less than four major appliances are involved no quantity discount is allowed. Where from four to six are involved, discount will be 5 per cent. Where seven or more are involved, discount will be 10 per cent.

The company agrees to keep trade-in allowances within reasonable limits. Old ice boxes, gas ranges, etc., will be appraised at their reasonable value—never to exceed 10 per cent of the purchase price of the new appliance. Appliances in good working order will be appraised on the basis of what they will reasonably bring in resale, including cost of reconditioning and reselling.

The company no longer delivers its merchandise on a free trial basis. However, it does permit its salesmen to demonstrate washers, ironers, etc.—such demonstration to result in immediate sale or return of the merchandise. In the case of refrigerators the company will not deliver a unit into a home until the sales contract has been signed.

All company new business representatives are remunerated on a straight salary basis. Equal credit will accrue to these men whether the appliance is purchased from the company or from a dealer, provided they have been instrumental in assisting to effect the sale. "This means that company representatives will canvass customers selling the advantages of the service which the company offers. When the subject of appliances is discussed, they will say that many good appliances are offered for sale by many dealers and suggest the customer investigate all before deciding which to buy. In short, they must conduct themselves so that all dealers have an equal chance with the company to sell the appliances involved."

The company will extend free to dealers such sales promotion and demonstration assistance as its home service department can give.

The company will work with dealers in building and training sales organizations.

The company's new business advertising will be of two general types: Use copy, featuring the advantages to be gained from the use of appliances but without mentioning any particular make or dealer; product copy, featuring the particular appliances carried by the company and appearing over the company name only. Product copy will always run in support of use copy.

The company will assist dealers in closing sales. New business representatives, however, will confine their remarks to the advantage of the service; the dealer salesman must do

their own job of selling the make of appliance involved.

Electric ranges, when sold for cash, will be sold at published list prices. The regular carrying charge will be added when purchase is made on the deferred payment plan. In addition to purchasing the range, the customer must pay the cost of inside wiring and connecting. Free service is rendered only for the usual one-year guarantee period and covers replacement parts and such labor as is necessary. If dealers provide adequate repair parts, the company will furnish the labor for a period of one year.

Dealers are asked to submit monthly reports on the number of appliances sold.

●

Hastening a Trend

To increase dealer sales, RMEL will subsidize local leagues

Largely because of the Rocky Mountain Electrical League's activities last year, the ratio which heretofore prevailed between dealers and utilities in sale of appliances has been reversed. Creation of more retail sales outlets and improvement in sales and promotional methods have been responsible for many of the dealers in the territory doing 80 per cent of the appliance business. The league's plan is to accelerate the trend even more.

To accomplish this purpose, league officers, meeting late in January, formulated a policy which calls for a prorated distribution of funds among active local leagues twice a year—in the spring and fall. Such financial assistance will be given on the basis of immediate election of officers and perfection of a budget of activities.

Apportionment of funds among eligible leagues will be made on the ratio of the number of electric customers in the local league's territory to the total number of customers in all the communities served by such local leagues.

In keeping with this policy, league officers also announced plans for formation of additional local leagues and scheduling of more active 1938 promotion.

●

Amateur Ironers

Unusual ironer campaign is begun by San Diego Bureau

With many of the catchy originalities that San Diegans seem always to think up for their Bureau of Radio and Electrical Appliance campaigns, the "Amateur Ironers' Contest" started on a sort of three ring circus promotion, Mar. 1. Built upon the idea that to sell ironers people must be induced to sit down and iron something, this campaign invokes an amateur radio talent contest as its method of creating interest, attracting crowds, subjecting a large number of people to the opportunity to try out an ironer, convince both a studio and a radio air audience of the simplicity and ease of operation of an electric ironer.

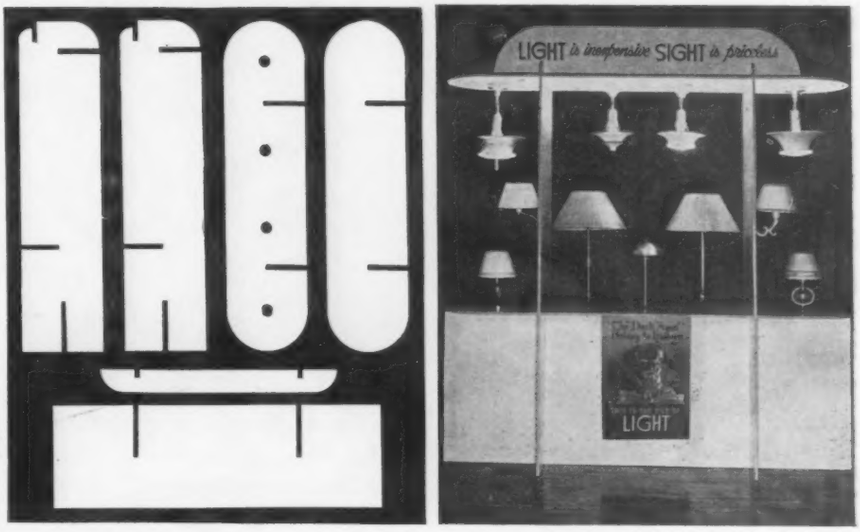
Technique: On Feb. 28, a series of 4 broadcasts in a "talent quest" began. Amateur talent was scouted up among local dramatic and music schools and by radio appeals. Conditions include registry at some appliance dealer's store, filling out a complete and authentic studio audition card. Advertising in newspapers, windows, etc., starts about a week before the big audition meetings, which are held for 3 or 4 days and evenings at the Legion building, Balboa park.

Fourteen makes of ironers have demonstration models on display, also demonstrators. Their main object is to get visitors to iron something—in this case, a towel which will be given to those who iron it. All amateurs must iron something to qualify. Talent tryouts will be held in the afternoon. The five best selected by popular applause will go on the air in the evening. Applause and response cards from listeners will determine the final winners, who will be given an engagement over a local radio station at regular pay. Each contestant in an interview will be asked about the ironer and how easy it was to iron on it.

No door prizes or capital prize are planned, according to J. Clark Chamberlain, executive manager of the Bureau. Dealers will obtain prospects through the demonstrations. The entire community will become "ironer conscious."

●

Selling Lamps with a New Display



A new and simple lamp display is this set-up developed by Pacific Gas and Electric Co. So arranged that it can be assembled in only a couple of minutes, the display goes together without the use of screws or nails but merely by fitting one slotted board (left) into another and so on for six boards

Future Campaigns

Sixteen organizations prepare for special sales events

Following campaigns and special events have been scheduled by Western utilities and merchandising associations for the next several months:

British Columbia Electric Railway Co.—Spring and summer range campaign to open March 12; special Range Week to be participated in by company and all dealers, March 12-19. Refrigerator shows for all company salesrooms, March 25-April 2; dealers will be asked to make special showings during this period. Electric water heater campaign to open March 5 with intense concentration April 1-July 1.

Central Arizona Light & Power Co. — Coffee maker campaign in April; automatic iron campaign in May.

Electric Appliance Society of Northern California and Pacific Gas and Electric Co. — Refrigerator campaign, April 21-May 21.

Idaho Power Co.—Range campaign in April; range and water heater campaign in May. Refrigeration shows in May.

Montana Power Co. — Range campaign in April; range and refrigerator campaign in May. April drive will feature regular prices, terms and trade-ins; no free wiring or other concessions will be made.

Pacific Power & Light Co.—Refrigerator campaign in April; the all-electric kitchen in May and June.

Portland General Electric Co. — Range campaign, stressing electric range advantages, in April and May. A spring range showing may be held in April.

Puget Sound Power & Light Co.—Range and water heater campaign in April and May.

Rocky Mountain Electrical League—I.E.S. lamp campaign, begun in February, will continue to Dec. 31. Sale of 35,000 units is the goal. To heighten the effectiveness of the drive, the league will send to all member companies a monthly questionnaire asking for information on past months' sales.

Seattle City Light—Ten dollar electric range wiring special and automatic tank hot water heating campaign in April; automatic tank hot water heating campaign in May. The special wiring offer will be extended on dealer sales. Special events for April and May include two exhibits of the all-electric kitchen, one on the utility's main sales floor, the other at the Contractors' Material & Construction Show which is cooperating with the FHA.

Southern California Edison Co. — Range campaign, started Feb. 24, features one range from each of eight or nine makes. Advertising campaign emphasizes each of the sales advantages of electric cooking in a single ad carrying the suggestion, "see your dealer."

Southern Colorado Power Co.—Refrigerator and water heater campaign in April; refrigerator, water heater and range campaign in May. Cooking school in May.

Los Angeles Bureau of Power & Light — "And Then She Bought an Electric Range" campaign starting March 15. Aluminum ware premium offer of last year will be repeated during a part of the drive.

Valley Electrical Supply Co. (San Joaquin Light & Power Corp.)—Lighting and range campaign in April; refrigerator and range campaign in May. Special cooking schools will be held in Fresno in connection with the April drive on ranges. (See Page 58.)

Electric Cookery Council of Southern California inaugurated its Spring Range Campaign at a meeting, Feb. 24, at the electrically equipped Police Recreation Clubhouse, Los Angeles.

Los Angeles Bureau of Power & Light advertises electric water heaters

Quota & Bogey

Essay contest backgrounds Utah Power's drive on range quota

Utah Power & Light Co. set sail on its 1938 sales course last month with all flags flying. Actual start was made with the inauguration of a cooperative electric range campaign; but a few weeks earlier Sales Manager W. A. Huckins announced objectives which were calculated to excite the most aggressive of salesmen.

Mr. Huckins' announcement took three tacks. Company sales objective he set at $928,605 (and dealers are expected to add $5,206,400 to the total). Textbooks, extension courses and class discussions will be spotted throughout the year in an effort better to train and educate salesmen. Changes in departmental set-ups include creation in the general sales staff of a centralized art department which will correlate windows through the territory, addition of a sales promotion section to the advertising staff.

Necessity for making a dent in the 5,000 electric range quota, however, formed the central point of interest. To avoid the tendency, noted last year when the utility offered a $25 allowance for trade-in ranges produced by dealers, of holding sales until the period of the trade-in campaign, the company introduced a 50-word essay contest on "Why I would like an electric range."

Contest, which started Jan. 31 and will end April 23, is being backed by a fairly heavy schedule of newspaper, radio, window and car-card advertising. Prizes of ranges, mixers, toasters and I.E.S. lamps will be awarded each week during the twelve-week period.

Add Shows

Figures and enthusiasm left in wake of appliance shows

Manufacturers' and distributors' appliance shows, which returned home last month after their annual jaunt around the Western circuit, left three items of varying importance in their dealer excitement.

Frigidaire, wearied by the copying of its best ideas, departed eastward pretty well convinced that its fighting words, "Save all four ways or you may not save at all," were stuck in Western dealer heads. By comparative tests of its "meter miser," officials claimed, Frigidaire's Master 6 refrigerator model can operate satisfactorily for 65/100 kw.-hr. per day, or 59c a month at a 3c rate. In this way Frigidaire can challenge the field on current consumption, food saving, ice making and low maintenance.

Frigidaire's best figures, however, were the result of a range survey which showed that: 55.2 per cent of all gas users think electricity better; 33.4 per cent say they will buy an electric range next; 45 per cent of the gas ranges in use are five years or older; 87 per cent of range prospects are sold on electricity before they even shop; 63.2 per cent of range prospects don't even shop, and 66.9 per cent buy on a friend's recommendation. Prediction made was that in 1938 there will be one range sale for every four refrigerator sales.

General Electric's show was of broader stature, almost all kinds of major appliance coming in for a share of the program. Official pep-talks, therefore, covered a wide range of subjects.

It was said that in three years 3,000,000 refrigerators have been sold to families with incomes of $1,500 a year or less; that for every five domestic refrigerators sold, one commercial unit could be sold; that the home-building drive will provide a hitherto unrealized market for electric sinks; that, since ironers have reached the 1,000,000 mark, only a prophet can tell how many more millions remain to be sold.

Meetings of Leonard refrigerator dealers took a different tack. Instead of holding just one regional conference in San Francisco, D. H. Capelli, merchandising manager for the San Francisco house of Graybar Electric Co., worked out a plan under which separate two-day meetings were held for each branch house in northern California. Result of the experiment was an increase over previous years in the number of unsolicited orders and sales franchises.

Crosley shows were entirely in the

hands of local distributors. Meetings were held by Chanslor & Lyons Stores, Inc., San Francisco; North Coast Electric Co., Portland and Seattle, Marshall Wells Co., Spokane; Sampson Wholesale Co., Boise, Ida.; Western Supply Co., Salt Lake City; San Diego Auto Electric Co., San Diego; Valley Electric Co., Phoenix, and Associated Wholesale Electric Co., Pasadena, Calif.

Norge show in the Northwest was conducted by F. B. Connelly Co., Seattle and Portland distributor for all Norge products.

●

Why Sell?

L. M. Klauber produces some figures which answer the question

Necessity for aggressive selling and smart promotion on the part of a sales department was backed up by cold yet convincing figures when L. M. Klauber, vice-president and general superintendent of the San Diego Consolidated Gas & Electric Co., told a recent assembled gathering of department heads, executives and key men from all departments of the company what the past two year's commercial activity had meant.

Operating men, Klauber said, often questioned the value of load building effort, contending that much business would come as a natural result of population growth. In terms of money, he declared, had there been no increased use of electricity stimulated, and only increases from new customers added, in 1936 the gross revenue, electric, would have been 6.4 per cent less than it was; in 1937, 12.1 per cent less. In net revenue the 1936 net would have been 9.1 per cent less; 1937 less by 17.5 per cent providing the 1935 use per customer had been constant for the two years.

In terms of kilowatt-hours the per cent increase over 1935 for 1936 for new customers only would have been 14; from increased use by customers it was 86 per cent. In 1937 the increase would have been 23 per cent from new customers only; from additional use it was 77 per cent higher. Klauber further told that such stimulated growth had made possible the recent salary and wage increases in spite of rate reductions.

Other speakers: Wm. F. Raber, president, on "pending legislation"; M. B. Fowler, secretary-treasurer, "taxes"; P. P. Pine, "Power sales, 1937—program for 1938"; G. H. P. Dellmann, "Lighting sales and plans"; H. G. Dillin, "rates and rules in relation to sales"; W. F. Chapman, "1937 extensions and 1938 expectations"; J. Clark Chamberlain, Bureau of Radio and Electrical Appliances, "Dealer relations"; F. M. Raymond, "Electrifying history"; H. J. Phillips, "gas sales and plans"; E. W. Meise, "Appliance sales and plans." A. E. Holloway, vice-president in charge of sales, conducted the meeting.

●

Five hundred dealers and salesmen sit on the edge of their chairs as B. C. Electric merchandises confidence in the new year. (See Col. 3)

Using Credit

Ten old maxims on credit are brought to light again

The credit policy of a store is a delicate instrument which fails when abused but which can uncover broad new areas of volume, profit, goodwill and public service when properly handled. Caution, therefore, should be the retailer's policy in extending credit.

It is on this ground that the National Retail Dry Goods Assn. has handed down an oft-repeated but too little observed list of requirements which should underlie sound credit extension not only by haberdashers and milliners but also by electrical dealers. Heading the list are the following items:

(1) Maximum terms on all types of installment sales must be revised downward to a goal of 24 months on electrical appliances. (2) Sufficient down payment of not less than 10 per cent should be secured. (3) Carrying charges should be one-half of 1 per cent on the original unpaid balance. (4) New applicants for credit must be more carefully investigated and selected. (5) Credit should not be extended where income or employment is indefinite. (6) Credit limits must be closely scrutinized and customers not allowed to over-buy. (7) Collections must be followed up diligently, on an individualized basis if necessary. (8) Slow-pay customers must be educated, by personal interview where possible, to cultivate the habit of paying promptly.

(9) Hazards which crept into retail credit structure in the last three years must be eliminated and unsound credit practices combatted in order to effect a gradual return to normal conditions. (10) Above all, the goodwill of the buying public must continuously be fostered.

●

Curing the Jitters

Nonsense plus fact kills the recession complex in B. C.

Faced with a recession-jittery sales force and an increased sales quota for 1938, B. C. Electric Railway Co. late in January took the only road out. It made fun of the whole thing.

Staged in Vancouver's largest hotel was a 500-guest banquet key-noted by a program of horse-play built round the reminiscent school-house scene. Following the welcoming address of Company President W. G. Murrin, the leading figures in the quota presentation trooped on to a desk-bedecked stage and ran through their year's home work in kindergarten style.

Whether such nonsense as mortar-boards, spit-balls, rosy apples and a red rooster will lead to the accomplishment of the year's $2,286,400 quota remains, of course, to be seen. At least the farce effected one thing as planned: It rid dealers, contractors and company salesmen of their fear of 1938.

Fair & Light

H. M. Crawford urges better illumination for stores

Accepted is the fact that adequate light is the advance agent of successful merchandising. But what modern store lighting, scientifically and artistically applied to fronts, signs, windows, merchandise displays and interiors, will mean to northern California merchants in 1939 has only recently been mentioned.

H. M. Crawford, general sales manager of Pacific Gas and Electric Co., brought the subject into the open last month when, writing to advise electrical dealers that P. G. & E. would continue its advertisements on better lighting through February, he added: "Golden Gate International Exposition executives predict an attendance of 20,000,000 people during the 288 days the fair gates will be open. Total expenditures (of visitors) will amount to approximately $250,000,000.

"It occurs to us that the local merchants who are best prepared to attract buyers will profit most from the rich potential market brought into being by the exposition. Is your store ready to receive the exposition trade in 1939? Seeing is believing—the first step toward buying. Purchases aren't made in the dark. Buyers turn instinctively toward light."

●

Consumer's Union

Coast research group will test electrical appliances

It's been a foregone conclusion that consumer's research groups would eventually open offices in the West, so it wasn't much of a surprise when the Consumer's Union settled in San Francisco late last month. Inasmuch as agriculture is the foremost Western industry, however, it was something of a surprise—although a tribute to the importance of the electrical industry—that the union should immediately undertake to study electrical household appliances manufactured in the eleven Western states.

Information which will make up the union's reports, going to 6,000 Western members, will be the usual run-of-the-mill stuff. Appliances will be put through all sorts of tests, prices will be studied and labor conditions under which the appliances are manufactured will be examined minutely.

Director of the organization is Miss Mildred Edie, formerly connected with *Tide* magazine and wife of Robert Brady, University of California professor of economy and chairman of the Western union office. Board of counsellors includes: Dr. Thomas Addis, Stanford University Medical School; Roe H. Baker, former executive of the A. F. of L.; Dr. Harold Brown, department of philosophy, Stanford; Aubreay Grossmann, attorney; H. P. Melnikow, director of the Pacific Coast Labor Bureau; Richard J. Neutra, architect; Dr. J. R. Oppenheimer, University of California Medical School; Eric Thompson, formerly of the U. S. Resettlement Administration; Jacob J. Weinstein, director of the School for Jewish Studies, and Wright Williams, organizer for the International Longshoremen's & Warehousemen's Union (Harry Bridges' organization).

●

Range Speed

John Stigman's course proves electricity is fastest fuel

Dealers and their salesmen who take the three-day course in electric range selling conducted by John Stigman in Los Angeles, receive an impressive demonstration in the speed of new model ranges. Class members are equipped with thermometers and identical pans containing measured quantities of water and a race is run to see which contestant can boil water quickest on electric and fuel type ranges. In one contest the high-speed, closed electric element boiled the water in 6 min. 35 sec., the open electric element in 7 min. 25 sec., while the fuel type range took 9 min. 48 sec. to bring the same amount of water to a boil.

The school is a cooperative undertaking for the purpose of training dealers and their sales forces in better selling methods. The course consists of demonstrations and lectures, and electrically cooked meals are cooked for class members on days when instruction lasts through the evening.

●

Touring the West lately has been the Burndy Engineering Co.'s showroom-on-wheels, a large truck in which practically every electrical connection requirement is displayed. Shown above is a typical group of linemen inspecting the display mounted on wing panels which slide out from the body of the truck. In addition to such on-the-spot demonstrations, the truck also visits industrial exhibits, trade shows and conventions

Home Show

New FHA terms will be theme of southern California exhibit

New and more liberal terms to finance homes under provisions of the Federal Housing Act recently passed, will become the main theme of the Southern California Home Show, to be staged by Grover McDonald, under rules of the Producers' Council, at the Pan Pacific Auditorium, Los Angeles, April 21 to May 1, 1938. Instead of staging its own "Electrical Age Exposition" the Electrical Development League of Southern California and the electrical industry are taking over the entire south wing, some 18,000 sq. ft.

Unusual feature of the show is that a 40-cent admission will be charged. Tickets will be sold in groups to dealers with permission that they offer their prospects a 15-cent discount. No prizes will be given nor will entertainment be an attracting feature for only small groups of strolling musicians will be employed. It is expected that in a community of two million people those really interested in home building will cheerfully pay admission to such a show.

Exhibits will include a sizable space taken by the gas industry, another by Sears-Roebuck; the banks and finance companies, retail merchants will have a joint display; real estate, building construction industries will be grouped; even gardens and landscaping will be shown. The F.H.A. and other agencies will have large educational displays.

Among electrical firms signing up for space at the last report, were Thermador, Los Angeles Bureau of Power & Light, White Sewing Machine Co., George Belsey, Eureka Vacuum Cleaner, Thor, Watson & Wilson, Ray Thomas, Fey & Krause, Maytag, Moore Electric Supply, Conner Distributing Co., D. E. Sanford, Pryne Co. Other well known manufacturers and distributors had not yet signed contracts because of delays in determining exact space requirements. Sam Gates, General Electric Co. heads the electrical committee of the general committee for the show.

Hitting New Highs

Copco pops up with a couple of startling records

Figures released last month by California Oregon Power Co. stifled a number of claims which other electric utilities might have made. Copco's average annual kw.-hr. consumption customer and average annual revenue per residential customer were the highest attained by any company in the United States. In addition its average rate was next to the lowest.

Average kw.-hr. consumption was raised from 1,853 in 1936 to 2,100.85 last year. Annual revenue in 1936, the latest figures available, was $44.22. Only Oregon Municipal Utilities have a lower average rate, and that is 2.29c to Copco's 2.39c.

●

Kitchen Experts

How Puget Sound P. & L. trains its home service girls

Puget Sound Power & Light Co. home service girls can now qualify as experts in kitchen planning and kitchen modernization as the result of a comprehensive project developed by Miss Edith T. Rauch, home service director of the company. The project consisted of an examination covering 22 different questions relating to new and remodeled kitchens. This was followed with three specific projects each dealing with an individual kitchen.

Any sales organization charged with the responsibility of selling electric kitchens could profit by a study such as that undertaken by these home service girls. The kitchen planning questionnaire which formed the basis for the first part of their course of study follows:

1. How large should the kitchen be? What factors determine its size?
2. Explain the meaning of work centers, their advantages and uses in the kitchen.
3. State the logical arrangement of a kitchen. Have the scientific arrangements proved to be practical?
4. Explain the advantages of the U-shaped kitchen. The L-shaped kitchen. The Corridor kitchen. The Square kitchen.
5. In planning a kitchen what factors determine the amount of cupboard space necessary?
6. What is the correct height and width of work surfaces? What materials would you recommend for work surfaces? Give their advantages.
7. Give the advantages of metal cabinets and wood cabinets.
8. How many doors and windows should there be in an average kitchen? Where should they be located?
9. Give lighting recommendations for an L-shaped kitchen 9 ft. 4 in. x 11 ft. 6 in. Give wattages. What is "soffit" lighting? Where would it be used in the kitchen? Where would lumiline lamps be used?
10. How many appliance outlets would you recommend for a 9 ft. 4 in. x 11 ft. 6 in. kitchen?
11. What major appliances should be installed in the kitchen? What small appliances should be included in the kitchen equipment?
12. What points should be considered in the selection of an electric range?
13. What size refrigerator would you recommend for a family of five, i.e., two adults and three children? Give reason.
14. Would you recommend a sink or dishwasher in a new or remodeled kitchen? What materials are most satisfactory for sinks?
15. How do you recommend heating a kitchen? Ventilating a kitchen?
16. What floor coverings do you recommend. Give six color schemes for a kitchen, six finishes for walls, ceiling and wainscoting.
17. In what type of home do you recommend a pantry?
18. Should there be dining facilities in the kitchen?
19. Are planning desks of recognized advantage?
20. How much electrical equipment can go into a home? How many appliances? What percentage of the cost of a house should be spent for electrical equipment?
21. What percentage of income should be budgeted for electrical equipment?
22. What percentage of income should be budgeted to operate the kitchen?

One of the three modernization projects which the girls had to complete follows:

Family consists of two adults and two minor children. The family income is $200 a month. They own their own home, which is 15 years old. The kitchen is antiquated and inconvenient. It is 10 ft. 6 in. x 12 ft. in size. It has three doors, one to the dining room, one to a hall, and the outside entrance. There is one window over the sink. The storage cabinets and work surfaces are located on both sides of the sink and extend the full length of the room, which is 12 ft.

The kitchen is equipped with a gas range, a sink, and ice refrigerator.

A small ceiling fixture supplies the lighting, and there is one appliance outlet located over one of the working surfaces.

What changes would you recommend?

$150 is available for labor and material for modernizing walls, ceilings, floor and cabinets. The new equipment will be purchased on a budget plan.

What type range would you recommend? What type refrigerator, etc.?

This kitchen has a northern exposure. Give recommendations for color scheme, floor covering, and curtains.

How much equipment can this family afford to buy? How much will their down-payment be for equipment purchased over a 24-month period? How much will their monthly payments be?

How much will it cost to operate the kitchen you recommend?

Draw plans.

●

POT LUCK —by Russell

"Good Heavens! That 'Oven Dinner Complete' recipe must mean to use separate containers"

Sales Shorts

AN ELECTRICAL ANNIVERSARY is the latest addition to wedding anniversary lists. The American National Retail Jewelers Assn. has announced that henceforth the eighth wedding anniversary is to be officially designated as the occasion for making gifts of electrical appliances. The National Electrical Manufacturers' Assn. has worked with the jewelers group for some time to have one anniversary so declared.

●

B. C. DAVISON and G. C. License are headquarters representatives for Western schools being held by Westinghouse to teach service engineers and representatives the problems connected with the sale, application and installation of commercial refrigeration systems.

●

INTENSIVE MERCHANDISING DRIVE on air circulators is being staged by General Electric, which has published a number of dealer and consumer pamphlets describing the advantages and various types of G-E circulators. Most elaborate booklets are entitled: "Profits from the Air," "Cool Comfort at Low Cost" and "New Fresh Air for Old."

COMMERCIAL-INDUSTRIAL sales manual, similar in purpose to the previously issued agricultural sales manual, has been distributed by Utah Power & Light Co. among all its commercial and industrial salesmen. Designed as a loose-leaf reference handbook, the manual contains information on sales quotas, history of the company, wiring specifications and tables, air conditioning data and photographs of installations, commercial cooking, water heating and lighting.

●

ELECTRIC HOME & FARM AUTHORITY has closed a contract with Modesto Irrigation District, Modesto, Calif., whereby the authority and utility will cooperate in financing sale of electrical appliances.

●

EMPLOYEE INFORMATION PROGRAM has been started by Pacific Power & Light Co. for the purpose of giving employees better information about the company, its history and problems and the electrical industry in general. One hour group meetings will be held twice monthly in all districts on the system.

SAN DIEGO CONSOLIDATED GAS & ELECTRIC CO. has launched a five-nights-a-week, 15-min. radio program built round episodes in the history of the electrical industry.

●

CITY OF FRESNO, Calif., is undertaking a definite program of enforcement of its sub-standard appliance sales ordinance. Commissioner of Public Works Jean L. Vincenz has assigned one man to devote his entire time to a campaign of educating dealers regarding the provisions of the ordinance. After a 30-day period it is believed work can be handled as part of the regular inspection department's routine.

●

KONVINCE-HER is the name of a new range demonstration board made available by Kelvinator to all dealer outlets. Developed to prove to the mass market that electric cookery is cool, clean, convenient, etc., the board serves as a simple laboratory at which the salesman can quickly and graphically illustrate in a concrete manner those intangible values which are hard to visualize through the spoken word.

TO STIMULATE INTEREST in the National Electric Range Spring Showing, April 11-30, the Modern Kitchen Bureau is sponsoring a $1,200 cash prize contest for window displays. The showing, as well as the bureau's year-long drive for range sales, is being backed by extensive advertising in national magazines, radio and newspapers.

●

POST MORTEMS on the Western Furniture Exchange's winter market, San Francisco, revealed that: Attendance was as good as at previous markets; buying orders held up well; exhibits were more numerous and more effective.

●

Apology

ELECTRICAL WEST is happy to take this opportunity to apologize to General Electric Supply Corp. for the unfortunate use of the word "consignment" in its February issue. Every one of the Hotpoint refrigerators and matched appliances which were shipped to southern California in January in a special 51-car train had been bought and paid for by dealers.

APPLIANCE SALES REPORT

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

APPLIANCE — *January 1938*	L. A. Bureau of P. & Lt.[1]		Idaho Power Co.[2]		P. G. & E. Co.[3]		San Diego Cons. G. & E. Corp.[4]		San Joaquin Lt. & P. Corp.[5]		Southern Calif. Edison Co. Ltd.[6]		Utah Power & Lt. Co.[7]		Wash. Water Power Co.[8]	
	Current	‡ Mo.	Current	‡ Mo.	† Current	‡ Mo.	† Current	‡ Mo.	Current	‡ Mo.	Current	‡ Mo.	† Current	‡ Mo.	Current	‡ Mo.
Ranges	400	400	122	122					99	99	297	297			91	91
Water Heaters	9	9	16	16					43	43	115	115			82	82
Air Heaters, aux.	206	206	88	88					60	60	248	248			159	159
Air Heaters, 220	66	66							57	57						
Refrigerators	1,389	1,389	152	152					213	213	1,410	1,410			212	212
Dishwashers	16	16							4	4					1	1
Washers	1,577	1,577	408	408					265	265	2,073	2,073			327	327
Ironers	285	285	55	55					63	63	293	293			25	25
Vacuum Cleaners	624	624	72	72					114	114	808	808			168	168
Radios	2,819	2,819	911	911					687	687	4,146	4,146			968	968
Mixers	186	186	76	76					37	37	291	291			138	138
Cookers, Casseroles	83	83	14	14					35	35	79	79			159	159
Irons	597	597	348	348					262	262	988	988			591	591
Waffle Irons	262	262	151	151					86	86	385	385			171	171
Toasters			168	168					121	121	586	586			333	333
Table Stoves	232	232	78	78					78	78	240	240			358	358
Heating Pads	281	281	87	87					67	67	322	322			178	178
Curling Irons											36	36				
Coffee Makers	81	81	165	165							324	324			300	300
Sewing Machines			11	11											53	53
Clocks	227	227	118	118					183	183	529	529			190	190
Fans	7	7	10	10					2	2	22	22			26	26
Floor Polishers																
Sun Lamps	24	24	16	16							33	33			6	6
Reflector Lamps			215	215					92	92					1,585	1,585
Miscellaneous Lamps			286	286					113	113	726	726			599	599
Yard Lights									22	22						
Misc. Small Appl.			208	208												

Sources:

[1] Compiled by Los Angeles Bureau of Power and Light for territory served by that system.
[2] Figures compiled by Electric Equipment Sales Association. Include power company sales and sales of all reporting dealers—about 60%.
[3] P. G. & E. reports sales of major appliances only based on accurate reports available from dealers' accounts. Ranges, water heaters and air heaters include company and dealer sales. Total dealers include gas as well as electric dealers.
[4] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Clocks, fans, included under miscellaneous.
[5] Includes dealer reports from Midland Counties Public Service Corporation also. Compiled by Valley Electrical Supply Company.
[6] Includes reports from dealers on San Joaquin Valley system of company as well as Southern California areas served.
[7] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.
[8] Dealer sales only for Spokane and company territory. Company sales not included. Table stoves, grills included with cookers.
† Under current month heading is shown previous month's figure. Lag of one month is also shown in total sales for year to date, which began December, 1936.
‡ January report was not available at time of going to press.

ELECTRICAL WEST

Appliance Sales Guide

Copyright 1938 by Electrical West, 883 Mission St., San Francisco All rights reserved including permission to reprint in whole or in part.

Home economists of the manufacturer or utility can give you simple instruction by which to learn to cook a few simple dishes

Excellent promotion is the free meal to a group of friends of a new customer, which you cook and explain, then leave them to play cards after you get a prospect list

Special promotions like a the window cooking demonstration (above) and the cooking school and appliance show (below) are always good sources of prospects. Advertised store demonstrations also bring out prospects

Simplified—yet success bringing:

What EVERY SALESMAN Needs to sell Electric Ranges

Because they are so obvious that it should not be necessary to mention them, the salesman's *personal appearance*, his *earnestness* and *enthusiasm*, need no more comment. These are elementary. Without them no one should waste his time trying to sell. Next it is necessary to

Learn the Product . . .

Take enough time to go over every detail of the range or ranges you sell, "from stem to gudgeon." Then no one can ask you a question you can't answer. Rehearse this as an actor would a play, so that you know every wrinkle, every feature.

Learn to Cook . . .

You wouldn't be apt to buy a car from a man who couldn't drive. So learn to cook *one* or *two* things well. Do it over several times so that you go at it like an old hand, without nervousness—easily, and if possible with a bit of a flare. Showmanship? Sure. Let it swing your prospect along smoothly to your closing questions. (It is a smart idea to use an electric range yourself at home. It gives your sales talk a ring of conviction you can't get any other way.)

Think Like Your Customer . . .

"It will be easy to keep this range clean simknow what the range will do, it should be obvious to your prospect. Remember that when you say, "porcelain enamel" she may not interpret that to mean "ease in cleaning, always pretty and bright." She may remember an unpleasant experience when porcelain chipped or cracked and you have set up a resistence instead of a desire. Therefore say, "It will be easy to keep this range clean simply by wiping it with a wet cloth, because it is finished in this clean, white, hard surfaced porcelain." Translate all the other attributes of the range into positive pictures of advantage and benefit. Organize all these points in your mind. (See the list of 11 such advantages on the next page.)

Select Catalogs, Data . . .

To smooth out—streamline—your selling presentation, arrange the catalog sheets, specification sheets, data on costs and any other reference material you may need so that you can lay your finger on it immediately and without losing your customer's interest. Good showmanship again! One of the most effective ideas ever put to use by successful range salesmen is this. Build up a sales manual of your own. If you clip out pictures of food, of features of the range, of cartoons and illustrations by which you can visualize the advantages of electric cooking, and arrange these in a scrap book in the order that is natural for you, even though crude, there is something about this home-made affair—maybe its familiarity, its personal meaning—that helps you put over twice as strong and convincing a story. This is decidedly worth doing.

The Order Book . . .

When shall you produce the order book? The minute you start to talk or demonstrate. This avoids the effect of "pulling the gun" on the prospect at the last minute. The salesman can more naturally write up the information needed for the order as he goes along. When you're ready to close there are no gaps left to fill in and divert the prospect. You will enjoy selling if you work a fine degree of timing into your operations.

Quick Demonstrations . . .

It is highly desirable to give your prospect a "feel of the wheel" sensation of actually operating the range herself. This builds up a sense of ownership in it. It dispells any fears she might have had as to her ability to run it. Therefore have a range in the store connected—or arrange with one of your purchasers to allow your prospect to try something easy on the range, actually doing all the fixing herself. Take any vegetable. Explain that it contains about 16 vitamins and mineral salts. By using too much water, these salts leave the vegetable, are poured down the sink in draining the water after cooking. Explain electric waterless cooking. Let her pour ¼ cup or less of water to 3 or 4 diced carrots in a pyrex covered dish (for visibility). Have her turn it on high, then when it begins to bubble, turn to low or simmer. Remember, 87 per cent of our impressions come from seeing. Use this visual sales talk to help you sell.

Closing . . .

Put your closing, or "asking for the order" in the form of a question that calls for a choice of one or another positive actions, and you will find closing easy. "Do you want the oven on the left or on the right?", "Would Thursday be a good day to make the delivery?" Suggest a decision that implies acceptance of the order. Make it easy for the prospect to get over the decision hump too.

. . . When the

What does "No" mean?

Usually it means either that your prospect has been misinformed by competition or is in ignorance of the special advantages of electric cookery. If you go through the following list of advantages, and demonstrate the qualities of your range, the chances of getting "no" for an answer are reduced materially. From **her** standpoint just what are the special advantages to electric cookery?

Briefly (for you can enlarge on each of these points), an electric range—

1. **Cleaner**—It's easier to be a good housekeeper, to keep kitchen, walls, drapes, furnishings clean. Pots and pans are always clean, silver and polished metals remain bright.

2. **Distinguishes you** — Makes you proud of your kitchen, of your cooking, of being ahead of the times with tomorrow's mode of cooking today.

3. **Tastier**—Produces better looking, better tasting, more appetizing, more digestible food; preserves the elusive vitamins better, retains valuable mineral salts, brings out full flavor and aroma.

4. **Economical to use**—For much of the cooking is done with electricity turned off. What you save in shrinkage is like a bonus on your food allowance. Electricity is economical to use properly, even if it might be expensive to waste.

5. **Gives you more time** to yourself when you want it to do sewing, go shopping, see a matinee, do club work, play tennis, or exercise. The automatic timer starts, watches, and stops cooking your meal for you.

6. **Healthier**—For family as well as house plants, birds, and pets. **Safer,** because even children operate it and no harm can result. You can go away and leave it cooking with perfect peace of mind.

7. **Reliable**—You can depend upon its accuracy to produce identical results time after time. The exact heat for every kind of cooking is at your instant command, and it stays exactly as you set it.

8. **Faster**—With new speed units it cooks faster than you will need, very often. After full heat is reached it cooks on stored heat, or on such low heat as you may require.

9. **Cool in summer**—Because all the heat is economically applied to the cooking you give it to do; not wasted to overheat the kitchen.

10. **Adaptable**—Should you want to rearrange your kitchen completely, you can place an electric range anywhere, irrespective of flues. Clever new arrangements use it in the middle of a kitchen divided to make a cozy sitting room.

11. **Lasts longer**—The way it applies heat, carefully, accurately, preserves oven linings much longer. Sturdy construction, ease of upkeep increase its life.

With these advantages, backed up by features of your range, you should be able to overbalance the most common obstacles, which are:

1. **Still thinks electric cooking is slow.**
2. **Fears operating costs are high.**
3. **Thinks range costs too much.**
4. **Fears electric cooking is complicated.**
5. **Wiring cost seems high.**

To meet these and dissolve them is a matter of showing—**(1)** the improvements in modern ranges, **(2)** presenting actual bills showing real range operating cost (the average nationally is now only about $2.50 a month), **(3)** comparing range value and long life with alternatives, **(4)** explaining and demonstrating how simple it is to use, **(5)** showing that this investment for wiring will make future additional uses of electric service easier. The more thoroughly you cover each question the better chance you have of closing the sale.

Once in a while you meet a more unusual resistance, one that is complicated by one of the following:

1. **Is afraid of electricity.**
2. **Is opposed to the utility company.**
3. **Is renting, and does not want to invest.**
4. **Has a good fuel range.**
5. **Wants to buy wholesale.**
6. **Just prejudiced, won't tell why.**

These require special handling, patiently, diplomatically. From the experience of some of the most successful range salesmen, the way to meet these resistances in their respective numerical order, is suggested on the facing page.

Prospect Says: "NO"

NO. 3B
ELECTRIC RANGES

1. **Fears electricity**—"Yes, I can appreciate your feeling that way about electricity. It is such a remarkable force. Properly controlled, though, like all the other great forces of nature, it is the most obedient, faithful, dependable servant you could ask for. And the engineers who designed this range took mighty good care to see that electricity would do just what you ask, not a mite more. They made this range so that it would be just as safe as electric light. I daresay you wouldn't want to be without that, in these days. When you consider that the way this range is made, you hardly need to go near it. You can prepare your meats and vegetables, put them in the range, set this simple little clock for the time to start and stop cooking, turn on the switches, and go away and forget it. Then it is so clean that you can actually keep flowers on the range without hurting them. There are too many good things here to miss. Why not get some of the real peace of mind it can bring?

2. **Opposed to the utility**—"It is really too bad some incident has caused you to feel that way. Such things are unfortunate and I daresay the many fine people I know over at the utility company would regret it as much as I do. Yet, after all, it isn't quite fair to deprive yourself of the pleasure of a modern, clean, economical electric range, is it? That would only be cutting off your nose, as the saying goes. The nice new range would be your own personal property, and the cost of what little electricity it used would be small in comparison to the kitchen freedom it would give you, the tastier and more healthful foods, the reputation you will have as an excellent cook, the pride you will enjoy in its attractive appearance. Better let me send you this model on Thursday. Shall I?

3. **Just renting?**—"Yes, that does make it hard to decide what to do, doesn't it? A few years ago it was an even more serious problem because so few people used electric ranges that moving meant so much bother to put one's electric range into use again. But the way people have taken to electric ranges in the last few years a person will just be out of date cooking in any other old fashioned way in a couple more years. That's why it will pay you to buy this electric range and be enjoying its healthful, appetizing cooking, the extra time it allows you to yourself to sew, or read or do other things, the cleanliness of it. It is a good long-time investment too, for it is sturdy, practically never wears out, is always attractive. Why not take advantage of all these good services, even though you are renting?"

4. **Has a good range**—"That's fine. Then I won't be trying to sell you if I just go over the really fine points of an electric range in case you ever feel like changing to this more modern way of cooking. I am so enthusiastic about electric cooking that I'd like you to appreciate it too." (Successful in a surprising number of cases is this idea, when the salesman goes right on and completely demonstrates and explains the range. The prospect doesn't feel as though she's under pressure. She goes away, but the thoroughness of the demonstration stays with her and keeps on selling her. Finally, in her own sweet time, she comes in and buys it outright. Try this also on the one who has been shopping around for a cheaper price, or for the one who wants to

5. **Buy wholesale**—"That's fine. I don't blame you for wanting to make any saving you can in your purchases. You wouldn't be a thrifty homemaker if you didn't look for ways to cut corners. I'd like to show you this range pretty thoroughly, though, if you have a minute, for when you buy wholesale you don't have the opportunity to shop and compare and to examine all the features and ask questions. You see wholesalers just aren't set up to give you the attention and personal service that a retailer is. That is how we retailers earn our profit, by spending the time with you, and taking care of you after the sale to make sure that you are completely informed on its operation and satisfied in every detail. Now in buying an electric range you will want several important improvements over older ways of cooking—cleanliness, peace of mind, tastier and more healthful foods—" (Then the salesman goes into every feature of the range he is selling, putting his full reliance in the trust that if he does a thorough job of selling, his prospect will feel safer to buy from **him** even if it costs her more money.)

6. **Prejudiced**—(The prospect who won't talk and who shows a strong prejudice tests the salesman's ingenuity most. It is a case of asking questions that will finally uncover a clue to the prejudice. Each question must indicate a strong sincerity to understand her point of view. Only when reassured that she will not be misunderstood will she let down her strong defences.) "Evidently you have very good reasons for feeling the way you do about electric ranges, Mrs. ——. Now I make my living selling these ranges, and you would be doing me a real favor if you could give me an idea of what is wrong with them, for I certainly do not want to earn my living under false circumstances. Please tell me what it is—".

PACIFIC POWER & LIGHT CO. • IDAHO POWER CO.
UTAH POWER & LIGHT CO. • WASHINGTON WATER POWER CO.

Were you able to go

to (*some local event*) yesterday?

You can, next time something you'd like to see or hear comes along, if you let us show you how.

You can have more time to yourself, when you want it, either to do sewing, go shopping, do club work, play tennis, or just plain visit, if you have a

BRAND NAME

Automatic Electric Range in your kitchen. The automatic timer starts, watches, and stops cooking the meal for you while you are away. It's like having a hired girl, and a lot cheaper.

Wouldn't you like to hear more about it at

Your Store

Address Town

How Fast?

do you want to cook?

Well you can cook that fast with the new (name of brand) electric range for it has the new high speed units. In fact it can cook faster than you will need, very often. Most of the time you will want to be cooking on its stored heat, with the electricity turned off, or on such low heat as you may require.

And you will find our service and attention to your inquiries or order just as fast as the modern electrical way to cook. Drop in to see the fastest thing in cooking

AT

Your Store

Address Town

TO WRITE YOUR OWN ADS

Occasionally it is a mighty good idea to use a few personalized ads of your own, even though the manufacturers and distributors of your make of electric range furnish you with excellent mats or electrotypes. As a rule these ads, ready prepared, can only tell the product story. In your advertising you need to tell your own local trade something about your own service, your establishment — the things that buying from you will insure them. The two sample ads on this page and the instructions below show an easy method for using the ideas and sales thoughts to be found on the inside two pages of this Sales Guide in framing simple ads that will be distinctive and help you to bring customers your way to buy their ranges—because you will be talking in terms of advantage and benefit to them.

for Ranges...

By all means make as full use as you can of the well prepared ads that the makers of your brands of ranges offer you. These tie your store to the big national advertising campaigns and tell your customers *where to buy.*

Many successful dealers feel the need of additional and more personalized ads of their own. They feel that they have two major ideas to advertise—first their own establishment with its facilities to serve the local people—and second the brands carried in stock. The manufacturer's ads take care of the latter. But only personalized ads written by the dealer will do the first.

Since the manufacturers devote all of their copy and illustrations to the product itself, and to special brand features or gadgets, the smart advertiser will make his own ads quite different, much more simple, homey, more personal, more neighborly. After all he lives in town and depends upon the friendliness of his townspeople to keep him supplied with customers.

The two sample ads on this page show how two of the advantage points of electric ranges, No. 5 and No. 8, of the 11 given on the inside of this Sales Guide, can be used to give a quickly read, personal and local sales message to a dealer's ad. They talk the customer's problem, and then invite her to come to the store to learn WHY the electric range will deliver the promised advantage.

Each of the other points can be made the main thought of a separate ad. For example, No. 1—Clean—ask in the heading, "*Are you proud of your home, like to keep it neat?*" With No. 2—Distinguishes you—lead into the ad with the thought, "*Why not take pride in your cooking, in owning a modern range?*" No. 3—Taste—"*Food that looks as good as it tastes and tastes as good as it looks,*" would introduce that paragraph.

No. 4—Economical—gives you an opportunity to kill two birds with one slogan, (and one of the most successful range salesman in the West has proved it). "*Electricity may be expensive to WASTE, but it is most economical to cook with properly.*" That statement sets the goal at proper and therefore economical operation, and prevents complaints of high cost of operation from those who are careless or wasteful in cooking.

Health, reliability, coolness, each have a similar appeal. Tie them into local or personal questions the same as with economy or speed. With No. 10, a particularly good suggestion to make is, "*Spring Cleaning time—Thinking of doing over the kitchen this year?*" Then the thought that the adaptability of an electric range permits her to put the range anywhere, may have special appeal. It may permit her to have a long wanted window, or needed cupboards by moving the kitchen around a bit.

In every case, get in a strong point about your store, its service, its friendliness, its attention to her personal tastes. This pays.

Industrial Sales

Proving that electricity is the answer in casting special alloys

Specifications for special alloy castings used by the airplane industry are of necessity rigid. Not only must the metal and the physical properties of the completed casting be pronounced perfect, but the casting must also be free of internal stresses. In order to meet these requirements and control the many variables involved, therefore, the manufacturer must be extra careful in his use of heating fuel.

Aluminum Alloy Casting Co., Los Angeles, has solved this problem by the use of electricity in all heating operations from melting the metal to heat-treating the finished casting. Sold to this company by industrial heating salesmen of Southern California Edison Co. and the manufacturers' representatives and salesmen was a melting furnace built by American Electric Furnace Co. and two heat-treating furnaces built by General Electric and Leeds & Northrup.

In the alloy manufacturing process an electric pot-type furnace melts the metal and brings it to the proper pouring temperature without disturbing the alloy analysis by overheating or excessive oxidation. The furnace has a connected load of 27 kw. with a capacity of 250 lb. of aluminum alloy. From a cold start, only four hours are required to bring the metal to the pouring temperature of 1290 deg. F. An electric time switch turns on the power at 5 a.m. so that the metal is ready to pour by the time the first moulds are finished at 9. When the furnace is hot, only 1¾ hours are required to melt a full charge. Accordingly, power consumption is 250 kw.-hr. per day of four heats or only ¼ kw.-hr. per pound of metal.

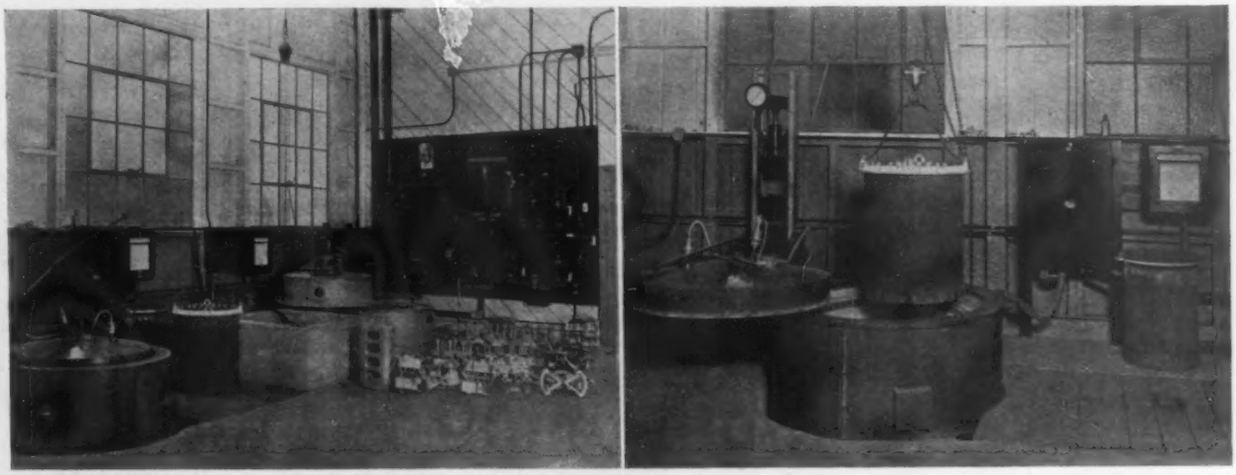
27-kw. electric pot type melting furnace

After the casting is made it is heat-treated in an electric pit-type furnace. The work is charged into this furnace from the top and, during the heating cycle, absolutely uniform temperature within the furnace is maintained by circulating the air with a fan. A recording electrical pyrometer regulates the temperature within extremely close limits as overheating the casting only a few degrees would make it worthless.

Two heat-treating furnaces, one with a connected load of 30 kw. and the other with 45 kw., are needed to meet the production requirements. Heat-treating for the purpose of annealing is done at 750 deg. F. and for hardening at 960 deg. F. The castings are in the furnace for 19 hr. during which time the power is on about 50 per cent of the time. Because the weight of the charge is governed by variations in size and shape of the castings, an accurate analysis of power used for heat treating is not available. However, an average charge in the larger furnace weighs 300 lb., which would show a power consumption of 1.25 kw.-hr. per pound of casting.

Any statement of power consumption would be meaningless unless comparative. At the usual power rates enjoyed on the Pacific Coast the total cost of melting and heat-treating would vary from 5 to 10 per cent of the cost of the metal itself and a considerably smaller percentage of the cost of the finished casting. This cost would be fully justified on the basis of quality insurance alone without any of the intangible advantages enjoyed by all users of electric heat in industry.

This is the first of a series of Pacific Coast industrial power applications. Any member of the P.C.E.A. who desires a reprint of each month's article may be put on the mailing list by filing his request with the chief commercial executive of his company.



Left—Heat-treating pits. Note pyrometer on wall, switchboard and wiring required. Right—45-kw. heat-treating pit furnace; charging basket above furnace

EDITORIAL

"Big" and "Little" Business

IN THE politically fostered suggestion of artificial cleavage between businesses, large and small, there is a parallel in the electrical industry. This industry is witnessing a demonstration, which many fail to recognize, of the fallacy that one branch of an industry may be penalized without injuring another. Tangled in red tape, beset by imposts and regulations, hampered by increasingly heavy burdens and subjected to public ridicule and abuse, the utilities—the "big business" of the electrical industry—are bearing the brunt of an attack, which, if successful, will fall most heavily on the "little fellows." Cripple the utilities, impair their efficiency, destroy their purchasing power and who suffers? Every individual small unit in the industry. The dealer cannot sell his appliances unless rates are low and service is good. The market for the contractor's services is restricted. Wholesalers' and distributors' business falls off. Manufacturers' agents and the manufacturers themselves must curtail because none of the other branches of the industry can buy their goods. Our industry is proof of the statement that large businesses make little businesses necessary and small businesses make large ones possible. Hurt the utilities and you hurt every other phase of the electrical business. They work together. Each has a vital and necessary part in the job of rendering electrical service.

You Can't Stop Now

ONE of the big cigarette manufacturers, leading the market at the time, eased off on advertising and promotion. It was sitting on top of the heap and could afford to coast—it thought. The coasting had not gone many months when it was discovered that this cigarette was in a very poor third place. It had lost sales numbered into the millions of cigarettes. You can't afford to stop.

Those companies which look at the narrowing net margin between the cost of promoting and selling electric ranges, water heaters, and air heaters and the revenue derived from them, and decide to ease off because it does not pay enough, will find themselves in the same predicament. Much of the load they already have won will slip away to competitive fuels. Part of the effect of advertising —and a large part—is that of keeping those who use a product sold on it, satisfied with it. In this fast moving, competitive age, nothing stands still. When it ceases to push forward, the stream carries it back. You can't afford to stop selling ranges, water heaters, air heaters.

The successful grocer does not cease to advertise sugar though his margin on it is unprofitable of itself. He knows that his customers use it to sweeten the coffee, tea, pastries, preserves, fruits that they buy or make from the products he also sells at better profit. The collateral electric use that accompanies a home equipped with range, water heater and air heat, the effect of electric living on business and commercial uses of electricity, round out the measure of return in a thousand subtle directions.

You *can* afford to push electric cooking, water heating and air heating for all that they are worth! For they are worth far more than appears to the mathematical eye alone.

Reducing "Load Mortality"

NEWEST responsibility of utility sales departments is the prevention of "load mortality." As defined in the 1938 sales manual of one Western power company, load mortality is "the loss of utility load or revenue from any cause, whether such cause be within the power of the sales department to prevent it or not. Preventing load mortality where it is preventable and off-setting its effects with soundly secured new business, where it is not preventable, is one of the most recent additional functions of modern utility selling."

What are the causes of load mortality? In general it results when the user becomes un-sold on the value and cheapness of electric service and therefore gets out of the habit of using it. Or it may be caused by competition. It derives from a weakness in past selling efforts. So intent has the whole industry been on selling equipment that, in most instances, sufficient time was not devoted to selling use—this was left to the customer to learn by experience. Where the customer heard a good "use" story at the time of purchase, he has not heard one since and has forgotten. Left to drift into acquired habits, he lost sight of the value of electrical service and the cheapness of rates.

The remedy lies in adjusted sales tactics. Along with the sale of new equipment and new applications there must be intensive sales effort on greater use of equipment now owned, on the value of electrical service, its flexibility and its cheapness. Only in this way will load mortality be held to a minimum.

ELECTRICAL WEST

DEVOTED TO THE ECONOMIC PRODUCTION, TRANSMISSION AND DISTRIBUTION OF ELECTRIC POWER AND ITS APPLICATION TO INDUSTRY, COMMERCE, AGRICULTURE AND HOME IN THE PACIFIC EMPIRE, AND TO THE MARKETING OF EQUIPMENT AND APPLIANCES AND OTHER UTILIZATION DEVICES IN THAT AREA

Salute to the Army

LOTS of water has rolled down the Columbia River since the Army took charge at Bonneville three years ago. At times during the last three years a lot of power men, for one reason or another, have got pretty well steamed up over the wisdom of sending the Army to Bonneville at all. But regardless of what any man's views on the political-economic aspect of Bonneville may be, he can't help taking time out to salute the Army engineers for tackling an engineering job of first magnitude, and for carrying that job to its successful completion in precise, military style.

Engineers at large and electrical men in particular join in this three-gun salute, and to these groups, three guns are tops. First gun: for the bold approach to, and patient solution of hitherto unencountered problems. Second gun: for maintaining a strict scientific approach—a credit to engineering and the service. Third gun: for a work which, in size and perfection, would, without the Army, never have been unfolded.

More Yardstick Power

AS A TRUE yardstick of power costs, the Federal Power Commission's allocation of investment at Bonneville bears about the same relationship to fair measure as does the butcher's fist to the standard pound in the vaults of the U. S. Department of Weights and Measures. As reported elsewhere in this issue the F.P.C. has assigned $11,682,400 of the $53,188,800 initial cost of the Bonneville project to the initial power development. This allocation consists of $9,180,500, representing the entire cost of power facilities, plus $2,501,900, which is one-fifth of 32.5 per cent of the $38,490,700 of facilities having a joint value for both power and navigation. Apparently the theory is that because but one-fifth of the ultimate power capacity has been installed, then only one-fifth of the cost of the joint facilities is a just charge. When the project is completed at an estimated cost of $74,144,600, the final allocation to power development will be $42,181,000 or 57 per cent of the ultimate cost.

It is difficult to reconcile these allocations with the treatment which this selfsame F.P.C. would accord a private power company had the project been built by one of the Northwest utilities. *Engineering News-Record* sums up the case with these embarrassing questions: "Would the commission have agreed to saddling such a large part of the cost on the taxpayers had the dam been built by private interests? If not—which can safely be assumed—is not the commission putting the federal government in the position of using its sovereign power to subsidize the users of power from Bonneville Dam at the expense of the farmers, the laborers and the merchants of the remainder of the country?"

Likewise any private utility would be forced to carry the full burden of initial costs in its rate base irrespective of the initial capacity installed, without the benefit of writeoffs or deferred charges. Power revenues would carry all of these charges or the company would go broke.

Federal power yardstick arithmetic, of which this is an example, thus continues to be more elastic than raw gutta percha. Certainly it is manifestly unfair to the utilities which must compete with its writeoffs, low interest rates and direct subsidies. The rates to be established on the basis of the Bonneville allocations can no more be used as a yardstick with which to measure the fairness of charges for identical service by private utilities than could a rubber band be used in place of a surveyor's chain.

Opportunity Knocks

LONG awaited, the plan book and advertising and promotional material of the National Adequate Wiring Bureau has just been received in all parts of the West. It is comprehensive and includes a variety of material to suit practically all local requirements. The next steps are up to us.

Some localities have been champing at the bit, impatient to get under way with such a program. They can be expected to lose no time in starting their promotional activities with the materials and ideas made available. Others are not so well prepared and will need to bring about the type of local organization which launched the refrigerator, the range, the electric kitchen, the better sight-better light idea with such effectiveness.

Perhaps it is well that wiring, the most difficult program of all, can inherit such a wealth of experience and technique from these predecessors within its own industry. Indeed the tremendous sale of these others has created the very situation of inadequacy for which this campaign has been instituted. They have built a market that cannot much longer be denied. More wiring must be sold. It shall be sold. Those whose business is embraced in wiring should lose no time to seize their opportunity at this critical moment lest it be snatched from them by eager outsiders who may visualize the potentialities of this hungry market and move in to satisfy it.

Los Angeles NECA

Stone Reelected Head of Contractors Group

A. L. Stone, Los Angeles contractor, was reelected over his protest to continue as head of the Los Angeles branch of the Southern California Chapter, National Electrical Contractors Assn., at its election meeting Feb. 14. He was selected from the executive committee of 7 previously named, and including, in addition to Stone, Herbert L. Evans, Nicholas Electric Co.; George De Ath, Peerless Electric Co.; Al Wotkyns, Quality Electric Co.; R. R. Jones, of South Pasadena; Geo. L. Patterson; and L. L. Goddard, Pacific Electric & Mechanical Co.

In accepting, Stone, who is also national executive committeeman for the N. E. C. A. for district 9, announced a policy of strengthening ties with other groups in the industry, including labor. Immediately a labor relations committee was appointed to confer with Local 83 on its proposed signed agreement. On this he named V. B. Sayre, chairman, H. L. Evans, J. O. Case, R. R. Jones, George De Ath, C. T. Smallcomb and C. J. Bennett. A report from it was expected at the Feb. 28 meeting.

A finance committee, headed by Roy Littlejohn, later turned in a report approved by the new executive committee, setting up a budget of $5,300 for the year, and recommending monthly dues of 1 per cent of the productive payroll, but not more than $50 a month, nor less than $10.

Details of a report of the National Executive Committee meeting which Mr. Stone attended will be given next month. Mr. Stone also announced that Earl Peak, president of the N. E. C. A. was planning to visit California, speak at the P. C. E. A. convention in San Francisco in May, and spend considerable time with members and associations in the state.

●

Wholesalers

Pacific Division, NEWA, Names England President

Increasing cost of doing business, the effect of various regulatory laws and a survey of 1938 markets occupied the attention of wholesalers at the annual meeting of the Pacific Division, N.E.W.A., at Del Monte, Calif., February 3-5, 1938. Henry I. England, president of Gilson Electrical Supply Co., Oakland, was elected chairman of the division for the administrative year beginning in June.

That the manufacturer has an obligation to study gross margins in the light of today's costs of doing business was the contention of Bon Clark, president of Westinghouse Electric Supply Corp. Citing his own company as typical, he pointed out that average gross margin has decreased from 15.1 to 14.5 per cent in the past four years despite demands from manufacturers that the wholesaler take over additional functions. With 56 per cent of the cost of doing business represented by payroll, Social Security taxes aggregating 6 per cent would represent an additional increase of 3 per cent in the total operating cost, he said. It was his opinion that wholesalers can continue to function only by getting higher margins.

HENRY I. ENGLAND

Following a 20-year custom, utility executives reported on market opportunities for the wholesalers in their respective territories. R. E. Fisher, P. G. & E. vice-president, presented a summary for 14 power companies which showed 1938 promotional expenditures set for $3,625,122 with additional budgeted newspaper advertising totaling $1,148,829. An anticipated decrease of 1.6 per cent was expected from the 1937 retail appliance sales of $81,010,475. Of this sum utilities sold $6,918,334 and dealers the balance. Major appliance quotas for 1938 were announced as follows: ranges, 35,120; water heaters, 17,494; air heaters 12,824 kw. and refrigerators 164,907. These utilities expect to add 63,901 new domestic customers during 1938.

Proposed activities of the Electrical Development League of Southern California were described by Ross Hartley, president. Latest developments in the Bonneville situation were covered by Lewis A. McArthur, vice-president of the Pacific Power & Light Co.; latest phases of legislation affecting business operation, by S. D. Elliott, assistant professor of law, University of Southern California.

First Meeting

North and South Work For I.E.S. Convention

A joint meeting of both the Southern California and Northern California sections of the Illuminating Engineering Society, the first of its kind, will be held in Los Angeles, April 4, coincident with the visit of Henry B. Dates, Case School of Applied Science, Cleveland, and president of the I. E. S. Plans will also be formulated for an annual Pacific Coast I. E. S. convention.

A cavalcade of automobiles bearing Northern California members will leave San Francisco April 3 for the Los Angeles meeting. John Erikson, secretary of the northern section, is in charge of the arrangements. Wm. P. Bear, Pacific Gas and Electric Co. is chairman of the joint committee.

●

ASILOMAR, near Pacific Grove on the Monterey peninsula has been selected by the Monterey Bay Electrical Contractors Assn. for the spring convention of the Northern California Electrical Contractors Assn, April 2, 1938. The local committee had been asked by President J. D. O'Connor of Sacramento to select the meeting place and make arrangements. Most vital subject on the agenda will probably be that of whether the California Sales Tax should apply to construction work, or only to the retail part of a contractor-dealer's business.

●

ELECTRICAL CONTRACTORS COUNCIL, INC., of Los Angeles, at its last meeting in January, dissolved when a petition signed by 27 out of its 35 members was brought in requesting dissolution. The Electrical Contractors Exchange, with which it was affiliated, however, is continuing and in fact now claims a wider membership and more extensive field of operations. Divisions in Santa Barbara, San Bernardino, Riverside and Redlands had been organized by Roy Gruendler and Al Evans of the headquarters staff of the Exchange.

●

ACCOUNTING AND ENGINEERING divisions of the Rocky Mountain Electrical League will hold parallel meetings in Denver March 28-29.

●

THIRTEENTH ANNUAL CONFERENCE of the Business Development Section, Northwest Electric Light & Power Assn., to be held in Medford, Ore., March 16-18, will consist of three general sessions and two half-days devoted to bureau and committee conferences.

NEWS OF THE INDUSTRY

CALIFORNIA ASKS FPC TO PROTECT POWER MARKET

Seeking to insure a market for Shasta Dam power if and when available, the California Water Authority offered to withdraw its opposition to the issuance of a preliminary permit for the Feather River hydro plants proposed by the Pacific Gas and Electric Co., provided the permit contained a provision protecting the future state-owned project. In making this stipulation at a hearing before Examiner F. A. Hampton of the Federal Power Commission in San Francisco, Feb. 16, engineers for the authority suggested that additional steam capacity, while costing the company more, would be more desirable for the fullest possible utilization of the Shasta power in 1943.

With 50,000 kw. of new steam capacity scheduled for completion in 1938, 80,000 kw. additional under construction and 40,000 kw. tentatively planned, P.G.&E. contended that load requirements in 1941 would require the availability of the full capacity of the 68,000-kw. Cresta plant on the Feather River. Engineering studies indicated that this hydro power would cost less in overall system operation than more steam capacity. If the Shasta plant is not completed by 1943 (state water authority engineers could give no assurance that it would be), then load growth would demand the completion of the 80,000-kw. Pulga plant, P.G.&E. engineers testified.

Bidwell Municipal Utility District and various irrigation interests backed the State Water Authority in its stand on the grounds that water costs would be increased if the Shasta Dam power could not be sold when available. Examiner Hampton allowed all parties until April 1 for the submission of briefs and 15 days thereafter for rebuttal.

IN A LETTER to Earl Lee Kelly, director of the California department of public works, President James B. Black of P.G. & E. reiterated that company's desire to coordinate its power development program with the Central Valleys Project. It is the aim of the company, he stated, to provide only such capacity as will be required for the immediate future. With growth placed at 60,000 kw. per year, this will mean that some power from the proposed Feather River plants will be needed before the Shasta Dam plant is completed, he said.

UTAH POWER & LIGHT CO. last month filed with the state supreme court briefs supporting a petition for rehearing in the Provo, Utah, municipal power plant case. Action came as the result of the December decision in which the court upheld the legality of ordinances under which Provo proposes to finance and construct the plant and refused to grant the company's plea for a writ permanently to restrain the city from proceeding.

PRUDENT INVESTMENT BILL INTRODUCED IN HOUSE

Acceptance through Congressional enactment of the prudent investment theory in utility valuation is provided for in a bill introduced Feb. 9 by Representative Frank R. Havenner of California.

This would amend the public utility holding company act of 1935 by inserting a new section permitting the Federal Power Commission, in approving interstate rate structures, to employ as a basis the prudent investment in used and useful electrical property, less accrued depreciation and the credit balances in other reserve accounts, plus a reasonable allowance for working capital. A second section would permit the commission to determine the prudent investment for every public utility.

CONGRESS HOLDS UP BIG THOMPSON PROJECT

Construction of the Colorado - Big Thompson irrigation and power project, which will divert 310,000 acre-ft. of water annually from the western to the eastern slope of the Continental divide through a 13-mi. tunnel under Rocky Mountain National Park, cannot be started until Congress revises the authorization act, Commissioner of Reclamation John C. Page announced last month. The difficulty is caused by a technicality in the law.

In the original authorization Congress specified that work should not be started until contracts had been signed with local interests guaranteeing full repayment, through project revenues, of the money to be advanced by the federal treasury.

However, the state law under which the irrigation district is organized, does not authorize the district to conduct a power business, and the project plans contemplate that the federal government shall retain control of and market the power.

HURRICANE LAYS LOW CALIFORNIA POWER LINES

Hurricane winds and days of rain teamed together last month to play hell with power company facilities in central and northern California. Roaring over a 300-mi. front, the storm left in its wake enough toppled poles and towers and trees to put out of service approximately 2,500 mi. of primary and secondary transmission lines, 8,000 mi. of distribution circuits.

Although hundreds of isolated sections and thousands of individual customers were without electricity, there was only one major system outage. That occurred in San Luis Obispo and vicinity, where the Midland Counties Public Service Corp. experienced a five-hour interruption, the longest in its history.

Service restoration was hampered by floods in the lowlands and heavy snows in the mountains. Line crews, aided by recruits from other departments, worked 48-hr. stretches to install temporary or permanent facilities. Complete permanent repairs probably cannot be effected for several weeks.

Communication companies also suffered. Telephone circuits from San Francisco to the northwest and east were out and messages had to be routed via southern California. A number of small radio stations was silenced when their antenna were blown down.

Issuing its regular monthly bulletin of snow survey and precipitation data on Feb. 9, the day the storm reached its peak, the State Department of Public Works reported that collection of the information was difficult "as many roads are blocked and communicating telephone lines are down." Although the report was consequently incomplete, it indicated that precipitation to the first of February exceeded normal in almost all sections. Figures ranged from 145 per cent of normal in the Upper Sacramento River Basin to 65 per cent in the Santa Ana Basin.

Since the storm had not reached full intensity by this date but had actually only just begun, report for March will show a tremendous increase in precipitation in all parts of the state.

Ground-water levels rose materially in Utah during 1937, the U. S. Department of the Interior announced last month. Greatest increases were recorded in the Ogden Valley, where the water rose 7.3 ft., and in the Milford district, where it rose 4.4 ft.

It's Standard in 1938!

. . . new, improved line of domestic ranges, with the FASTER KALMAX Burner and more economical EVEN-OVEN

. . . plus the wonderful 818 COMMERCIAL line (for volume in an untapped field)

. . . plus the liberal 1938 Standard Plan of dealer cooperation

Standard, which has pioneered so many of the important electric range developments, is today in stronger position than ever before to cooperate with dealers in promoting profitable range sales. The new improved 1938 Super Series Standards are the finest in all the long Standard Electric Range history . . . and 1938 will see the most aggressive promotion by Standard in working with its dealers. . . .

Mail coupon below for full details!

No. 1540 "Capitan"

Capitan (No. 1540) . . . one of the beautiful new Super Series Standards for 1938

Standard Electric Manufacturing Corporation
Toledo, Ohio W4

Please send information on
( ) Standard 1938 Domestic Ranges
( ) Standard 1938 Commercial Ranges
( ) Standard Dealer Plan for 1938

.....

.....

Reclamation Bureau Lets Grand Coulee Contracts

Contract for the completion of the high dam at Grand Coulee was awarded Jan. 28 to the Interior Construction Co., now called Consolidated Builders, Inc., of Oakland, for $34,442,240. The bidder is a newly organized combination comprising: Silas Mason Co., New York City; Walsh Construction Co., Davenport, Ia.; Atkinson-Kier Co., San Francisco; Morrison-Knudsen Co., Boise, Ida.; J. F. Shea Co., Los Angeles; McDonald & Kahn, Los Angeles; Pacific Bridge Co., San Francisco; Henry J. Kaiser Co., Oakland; Utah Construction Co., Ogden, and General Construction Co., Seattle.

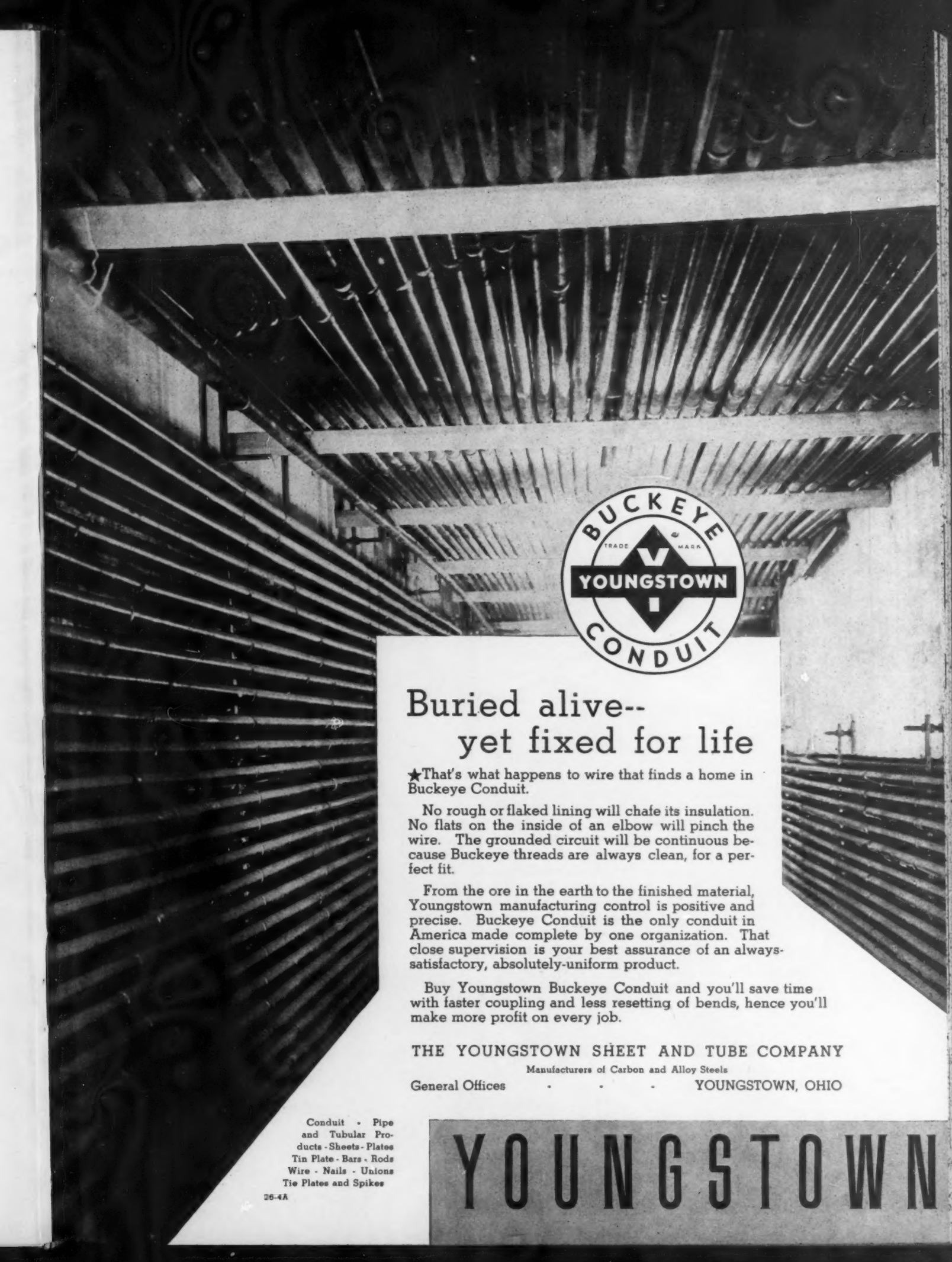
Contract involves the manufacture and placement of about 5,250,000 cu. yd. of concrete, and the placing of 160,000,000 lb. of reinforcing steel, 10,000,000 lb. of pipe, 50,000,000 lb. of gates and operating devices, 24,000,000 lb. of trash rack metal and 16,000,000 lb. of penstock. It does not include materials, except sand and gravel, which will be excavated from a site near the dam. (A separate contract for 1,700 tons of deformed reinforcing bars was awarded on the same day to the Columbia Steel Co. of Denver.)

Covered by the contract is completion of the high dam to 553-ft. height, 4,500-ft. length, construction of the west side power house superstructure and appurtenant works.

The contractor must start work within 30 days of notification by the Bureau of Reclamation, which will be issued as soon as contract formalities are completed, and will have four years in which to finish the work.

Less than $2,000,000 remains of the money already appropriated for the project. The present budget carries an additional $13,000,000, and there is little likelihood that this amount will

Grand Coulee low dam completed



Buried alive-- yet fixed for life

★That's what happens to wire that finds a home in Buckeye Conduit.

No rough or flaked lining will chafe its insulation. No flats on the inside of an elbow will pinch the wire. The grounded circuit will be continuous because Buckeye threads are always clean, for a perfect fit.

From the ore in the earth to the finished material, Youngstown manufacturing control is positive and precise. Buckeye Conduit is the only conduit in America made complete by one organization. That close supervision is your best assurance of an always-satisfactory, absolutely-uniform product.

Buy Youngstown Buckeye Conduit and you'll save time with faster coupling and less resetting of bends, hence you'll make more profit on every job.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices - - - YOUNGSTOWN, OHIO

Conduit • Pipe and Tubular Products - Sheets - Plates Tin Plate - Bars - Rods Wire - Nails - Unions Tie Plates and Spikes

26-4A

YOUNGSTOWN

No. 201 N. E. Klein Side Cutting Plier. "Stream lined" for use in confined spaces.

Good workmen demand good tools. In the hands of men who know — everywhere — the pliers are invariably Kleins. Only the keen, hand-honed, perfectly matched cutting knives of Klein Pliers — only the comfortable spring grip in the Klein handles — only the general all around quality that is an inherent part of every Klein Plier can satisfy men whose work demands the best in tools. This, perhaps, explains why Klein Pliers are the standard of quality by which others are judged — why the name Klein has stood for maximum quality, "since 1857."

DISTRIBUTED THROUGH JOBBERS

Foreign Distributor: International Standard Electric Corp., New York

---

The four pamphlets listed below will be sent without charge to anyone interested. Check the ones you want:

- ☐ Safety for the Pole Climber.
- ☐ Specifications on Linemen's Belts and Safety Straps.
- ☐ The Safety Factor on Linemen's Leather Goods.
- ☐ Pocket Tool Guide.

Mathias KLEIN & Sons
Established 1857 Chicago, Ill. U.S.A.
3200 BELMONT AVENUE

be increased.

The $15,000,000 must therefore cover purchase of raw materials and equipment as well as payments under the contract. Gates and pipe along with other equipment and material will take half of this sum.

●

San Diego Dedicates New Steam Plant

Turbo-generators, as a general rule, are lacking in "umph"—the modern synonym for "sex appeal". The more efficient they are the less dramatic. To dedicate one in such a manner, therefore, as to impress a community it is to serve, is something of a problem. Yet San Diego Consolidated Gas & Electric Co. managed to do just that when it officially started its new 35,000 kw. General Electric turbo-generator and two new Babcock and Wilcox 200,000 lb. per hr. steam boilers, Feb. 15.

Using the medium that it has made such an effective means of expressing itself to the public of San Diego county, the radio, dedication ceremonies were broadcast over two local stations following a careful dramatization of the numerous steps leading up to completion of the important generating plant addition. Some of the important historic events in the company's service to San Diego were reviewed, a scene in the board of directors meeting at which the proposal to build such a costly plant addition was debated, and the decision to place faith in the future of the city was recounted. Then the listeners on the air were switched to the power plant where a large party of mayors, public officials, newspaper men, and civic leaders from all towns and cities served by the company were being shown the plant.

From here the speeches of Wm. F. Raber, president of the company, presenting the new generator to the community service, talks by R. M. Alvord, General Electric Co., San Francisco, and president of the P. C. E. A., acceptance speeches by the mayors, and a description of the big generator and its accompanying equipment by the radio commentator were heard over the roar of the generators in the station.

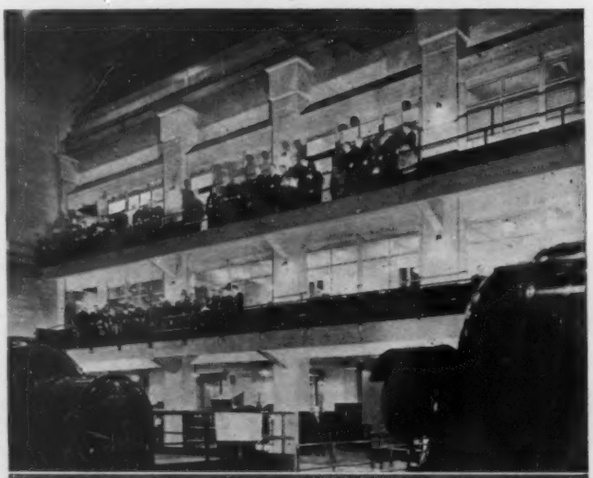
An attractive booklet was presented all visitors and mailed to all listeners requesting a copy. In it Reddy Kilowatt briefly reviewed the company's facilities to serve the community, presented Mr. Raber's dedication, and in two pages of diagrams effectively told the story of consistent rate reductions for 10 years past, and broke down the company's income and expenditures into readily understood terms.

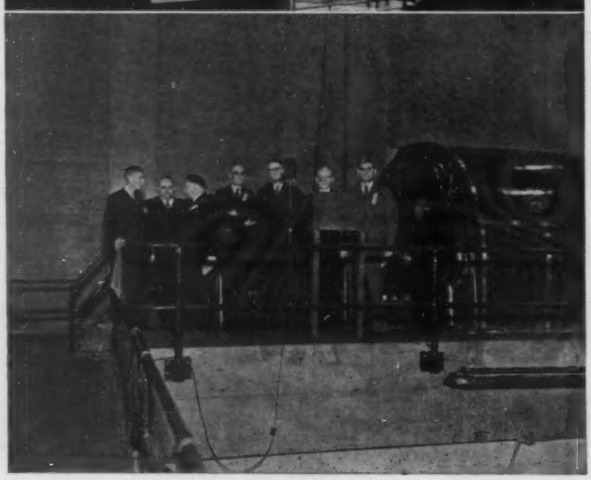
●

APPLICATION FOR REHEARING on the proposed sale and transfer of all facilities, licenses and assets of the Inland Power & Light Co. to the Pacific Power & Light Co. was denied last month by the Federal Power Commission.

●

IDAHO POWER CO.'s Black Canyon dam, near Emmett, Ida., is being overhauled to increase the efficiency of generators and pumps at the power house. Invested in the project is about $30,000.





FPC Allocates Costs For Bonneville Power

Recent Washington visit of Bonneville Administrator J. D. Ross has brought fruit in two quarters. Simultaneous were the announcement by Secretary Ickes that he has approved and sent to the War Department the Administrator's request for the installation of two additional generating units and the announcement by the Federal Power Commission that it has allocated $11,682,400, or 22 per cent of the $53,188,800 initial development cost to power. Ultimately, as additional generating machinery is added to the full capacity of the development, the commission increases the proportion of power cost to a final value of $42,181,000, or 57 per cent of the ultimate capital investment estimated at $74,144,600.

Cost estimates by the commission cover both the initial development of 86,400 kw., on which commercial service will begin within a few months, and the ultimate installation of about 504,000 kw. These include interest during construction at 1.54271 per cent, the "weighted average rate" paid on all money borrowed by the United States from Nov. 1, 1933 to Dec. 31, 1937.

	Initial	Ultimate
Entirely for navigation...	$ 5,517,600	$ 5,517,600
Entirely for power.....	9,180,500	29,448,000
Facilities used jointly.....	38,490,700	39,179,000
Total	$53,188,800	$74,144,600

In determining the proportion of the cost to be charged to power the commission determined that, at full development, 32.5 per cent of the jointly-used facilities might fairly be so allocated, giving a charge of $12,133,000. To this it added 100 per cent of the cost of facilities used exclusively for power development, amounting to $29,448,000. This gives a total power allocation for the finished project of $42,181,000, or 57 per cent of the $74,144,600 total cost. No explanation is given as to the basis for the 32.5 per cent assumption.

In determining the allocation for the initial development the same general procedure was followed. The 32.5 per cent proportion was applied to the $38,490,700 cost of jointly-used facilities, and this result in turn divided by five, because the power plant is initially installed only to one-fifth of its ultimate capacity. The resulting figure is $2,501,900 which is added to $9,180,500 (the cost of facilities devoted exclusively to power production) to yield a total of $11,682,400, chargeable to power production in the initial development.

It is interesting to compare the FPC's findings with an allocation suggested by Major-General E. M. Mark-

DIRT—DEVILTRY—DIVERSION

(The Three "D's")

Your Electric Meters are normally honest, accurate assets

Any or all of the "Three D's" will turn your electric meters into tricky, inaccurate liabilities.

Superior Overall Meter Enclosures will protect your meters from Dirt, Deviltry and Diversion.

Write for Bulletins 378 and 379

Superior Switchboard & Devices Company

CANTON, OHIO

*Been at it Since 1920

SUPERIOR

REG. U. S. PAT. OFF.

METER
and
CONTROL
Off-peak Loads
with

MODERN METERS

Sangamo Type HV-S-2
Two-rate Meter, Socket
Mounting

Sangamo Type HV-A
Meter and Time-Switch
In "A" Base

For MODERN LOADS

Western
Offices:
LOS ANGELES
326 Subway Term. Bldg.
SEATTLE
220 Ninth Ave. N.
PHOENIX
448 W. Madison St.
SAN FRANCISCO
1061 Howard St.
DENVER
1526 Blake St.

SANGAMO
ELECTRIC
COMPANY
SPRINGFIELD, ILLINOIS

ham, then chief of engineers, in testimony before the House committee on rivers and harbors during its consideration of the Bonneville bill. This was presented March 9, 1937, when considerable work still remained to be done on the project. General Markham estimated the cost of navigation facilities at $5,631,300; of power facilities at $11,089,400 initially and $11,556,000 ultimately; of jointly used facilities at $38,046,000. However, he proposed that half the cost of joint facilities be charged to power and half to navigation, and on this basis calculated the capital cost chargeable to power at $30,112,400 for the initial development and $50,579,000 for the full ten-unit installation.

●

CERTIFICATION OF THE California Gas and Electrical Employees Union as bargaining agency between outside physical employees and the Pacific Gas and Electric Co. has been indefinitely postponed following a recommendation by Mrs. Alice M. Rossiter, regional NLRB director, that a hearing be held to investigate CIO's charges of intimidation and coercion. Date for the hearing has not been set.

●

ESTABLISHMENT AT Stanford University of the W. Wesley Hicks graduate fellowship for the study of electric house heating has been made possible through a gift by Wesix Electric Heater Co., San Francisco. Carrying an annual emolument of $1,000, the fellowship is for the purpose of studying load factor, demand factor and other technical phases of electric heating. It will be administered by the engineering division under the direction of Dr. F. E. Terman of the departmen of electrical engineering.

●

SOUTHERN PACIFIC RAILROAD Co., last month reached an agreement with the California Water Authority whereby the 30 miles of track which are to be relocated will temporarily be routed around Shasta dam through a 1,600-ft. tunnel. The tunnel later will be used for diversion of water. The agreement will make possible the concurrent construction of reservoir and dam.

●

PASSED LAST MONTH by Kitsap County (Wash.) Commissioners was a resolution providing for a vote next November on the formation of Kitsap County Public Utility District No. 1 and for the election of three public utility commissioners. An aftermath of the recent franchise power fight, the resolution was included in the franchise granted Puget Sound Power & Light Co. to build 26 mi. of rural line.

Puget Sound Power Rates Include Tax Clause

Puget Sound Power & Light Co.'s new rate for wholesale power to rural cooperative associations, effective Feb. 28, carries a tax clause protecting the utility in the case of any future imposition or increase of federal, state or municipal taxes on the generation, transmission or sale of power or the conduct of a utility business. Provision is made for the proportionate allocation of such taxes to the charges in the rate. In case taxes should be reduced or repealed, provision is also made for a reduction in the rates charged.

The new tariff carries a demand charge of $3.00 per kw. of maximum demand (15-min. interval) including 200 kw.-hr. per kw. plus energy charges of 1 cent per kw.-hr. for the next 100 kw.-hr. per kw. and 0.6 cent for all additional energy used during the month.

●

San Joaquin L. & P. Seeks New Franchise in Fresno

San Joaquin Light & Power Corp. last month applied to the Fresno city commission for a new, exclusive and indeterminate franchise to distribute power in the city. The new franchise would replace the existing agreement which will end in 7½ years.

Provided under the proposal is payment to the city of a 2 per cent franchise tax amounting to about $6,500 a year. This would be collected on gross earnings from power and heat energy delivered, but would exempt gross earnings for lighting energy.

The city derives no revenue from the present agreement.

●

STEPS TO CONDEMN property for a right-of-way which will circle the City of Renton, Wash., on three sides just outside the corporate limits were being taken last month after the Renton City Council rejected Seattle Ctiy Light's application for a franchise to construct Skagit transmission lines through that city.

●

ARGUMENTS IN THE FEDERAL government's suit against the City of San Francisco over the "agency" sale of Hetch Hetchy power to Pacific Gas and Electric Co. were to be heard March 4 before Federal Judge Michael J. Roche.

●

ORDINANCE APPROPRIATING $121,700 from the city light fund to buy and install duplicate switching facilities at Lake Cushman No. 2 plant has been passed by the Tacoma, Wash., city council.

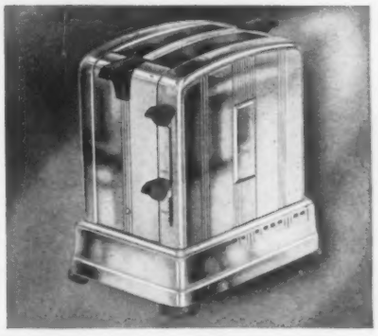
MORE APPLIANCE SALES IN 1938 WITH UNIVERSAL

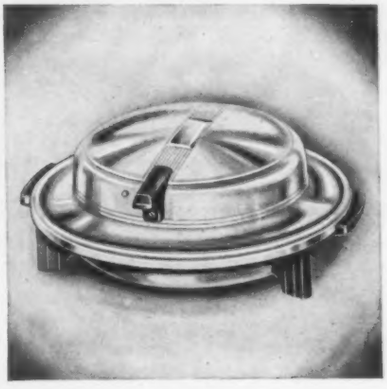
The greatest opportunity for increasing your volume is through the biggest business in the world, housekeeping, and with the oldest name in the household field, UNIVERSAL—the housewives preference for 3 generations.

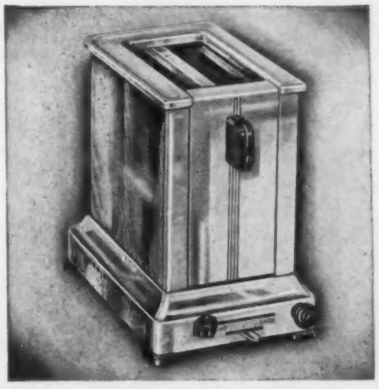
Better made for greater sales, UNIVERSAL Electrical Appliances for 1938 present new eye-appealing modernistic designs—latest conveniences—bigger values and are priced to reach a wider market than ever before.

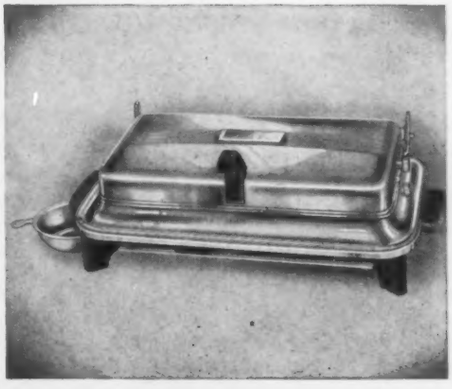
A name that has stood the test of time

The name UNIVERSAL appears on the largest line of both small and major electrical appliances in the world and to housewives everywhere it signifies highest quality and guaranteed service.









Manufactured by LANDERS, FRARY & CLARK, New Britain, Conn.

Reliable

CONCENTRIC CABLE CLAMPS

Install Service Cable more conveniently.

●

Save a length of cable on each installation.

●

Reliable Concentric Cable Clamps are high in strength, neat and non-corrosive. They do not injure the cable and they are reasonably priced.

Reliable ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE - CHICAGO ILLINOIS

TO MEET GROWING NEED of more power Cariboo Gold Quartz, Wells, B .C., has purchased a 437-hp. diesel engine which will be connected directly with a 375-kva. generator. When the unit is cut into the present diesel-electric power setup about the first of the year, Cariboo will be developing and using a total of 1,800-hp. at their 4,000-ft. elevation.

●

PUGET SOUND POWER & LIGHT CO. has received a temporary permit from the U. S. Department of the Interior to construct transmission lines to serve approximately 60 homes in Snee-Oosh, a summer resort, and the Swinomish Indian Reservation near LaConnor, Wash.

●

APPLICATION FOR PERMISSION to use 1,000 sec. ft. of water at Henry's Fork of the Snake River for municipal power purposes has been filed with the Idaho State Reclamation Dept. by A. G. Miller, mayor of St. Anthony, Ida. The city proposes to build a dam, power plant and 2.8-mi. canal at an estimated cost of $165,000.

●

FEDERAL POWER COMMISSION has instistituted an investigation to determine whether Montana Power Co.'s maintenance and operation of its Thompson Falls plant without a license from the commission constitute a violation of any provision of the Federal Power Act.

●

DOMINION ELECTRIC POWER, LTD., has been incorporated as an extra-Provincial company under the B. C. Companies' Act and has paid up capitalization of $1,192,900. Registration in British Columbia was in connection with the operation of an electric public utility company at Dawson Creek, B. C.

●

RECONNAISSANCE REPORT on water-power resources of the Nehalem River, Ore., recently published by the Department of the Interior, outlines a plan of power development through 375 ft. of head at sites downstream from a point near Elsie. Total potential capacity of the basin is estimated at 120,000 hp. in years of average run-off; of this, 85,000 hp. would be available from the storage at the Elsie reservoir, from which water could be released at any desired rate.

●

TWENTY-FIVE-YR. FRANCHISE to install transmission lines along four roads in Cowlitz County, Wash., has been granted Puget Sound Power & Light Co.

●

THE 1937 FRANK MCLAUGHLIN Safety Trophy awarded annually to the Puget Sound Power & Light Co. division with the best safety record for the year was won by the Western division with headquarters in Bremerton, Wash.

GROSS OPERATING REVENUES of Southern California Edison Co. for the calendar year 1937 amounted to $42,289,-603, an increase of $633,535 over the preceding year, according to preliminary figures announced last month.

●

PRELIMINARY GROSS OPERATING revenues of Southern Colorado Power Co. for the year ending Dec. 31 amounted to $2,336,744 as compared with $2,212,501 for the corresponding period 1936.

●

ADDITIONAL APPROPRIATION of $20,000 to complete a concrete intake at the Gorge tunnel of the Skagit hydroelectric development has been asked of the Seattle City Council by W. J. McKeen, acting superintendent of city light.

●

ELECTRICALLY OPERATED DRAW will be installed on the interstate bridge crossing the Columbia River at Hood River, Ore. Installation has been made necessary by the Bonneville project which will raise the water level to a point where river boats will be unable to pass beneath the bridge.

●

FRANCHISES TO ERECT some 50 mi. of rural line in Lincoln County, Wash., have been granted North Ridge Power & Light Co. and Sassin Power & Light Co.

●

REPORT SHOWING ELECTRIC RATES in effect Jan. 1 in California has been released by the Federal Power Commission. The report is one of a series designated as "1937 Rate Series B."

●

PLANS AND SPECIFICATIONS for a double circuit Skagit transmission line from the Gorge plant to the south receiving substation in Seattle were approved last month. Announced as the tentative date for opening bids for the work, estimated to cost in excess of $200,000 and involving the stringing of six 116-mi. lines, was March 17.

●

FLOOD CONTROL CONSTRUCTION on the Siletz, Deschutes and Sinslaw Rivers, Ore., would cost more than the total of the anticipated benefits and is therefore not economically justified. This is the finding of the U.S. Army Engineers' report filed last month with the flood control committee of the House of Representatives. A separate report on the Crooked River, a tributary of the Deschutes, will be submitted later.

●

NEW FOREMANSHIP TRAINING course for plant men, linemen, salesmen, etc., has been inaugurated in all divisions and for all plants of Utah Power & Light Co. In each group the experience represented totals about 800 years.

SHORTENED WORK WEEK to meet the business emergency has been decided upon by the San Francisco Electrical Contractors Assn. Inc., and local No. 6 of the International Brotherhood of Electrical Workers. The labor agreement between the association and I.B.E.W. provides that when a certain percentage of the union's membership is without work, negotiations will be started to adjust the work week so as to spread employment and prevent distress. Beginning Feb. 21, San Francisco shops worked men four 8-hour days. Foremen work 5 days. On March 1 men are to work three 8-hour days. Men may be grouped so that one crew works Monday, Tuesday, Wednesday; the second crew Thursday, Friday and Monday, and so on. As soon as the employment opportunities improve a longer work week will be resumed.

●

ALL-AMERICAN CANAL hydro-electric power development was given the go-ahead signal in an order signed by the District of Columbia Supreme Court late in January. A temporary injunction issued in a suit brought by Nevada California Electric Corp. was dissolved by the order. The action removed the last legal barrier in the path of the project since the U. S. Supreme Court had previously upheld the PWA program.

●

PLUMBERS in Fresno are being sued by Barrett-Hicks Co., hardware and plumbing firm, as an outgrowth of a strike called upon the latter by the plumbers union when the Barrett-Hicks Co. refused to join the master plumbers association. Charges of price fixing are involved and the district attorney and grand jury are investigating the possibilities that the anti-trust laws were being violated.

●

PETITION FOR A REHEARING of the case in which the Utah public service commission ordered Utah Power & Light Co. to reduce rates by $350,000 annually was filed last month by the Consumers' Welfare League of Utah. Principal objection of the league is that "the finding of $73,045,647 as the reproduction cost of the plant" of the company was "arbitrary and cannot be sustained by the evidence or the law."

●

PUGET SOUND POWER & LIGHT CO.'S case attacking the validity of the City of Seattle's impounding of municipal railway receipts to pay current operating costs of the street railway system instead of meeting interest and bond retirements will be heard before Federal Judge John C. Bowen in Seattle March 15.

PACIFIC GAS AND ELECTRIC CO. last month lost its Supreme Court fight to halt the sale of $12,000,000 worth of Sacramento Municipal Utility District bonds to finance a municipal power system. The company had contended that it would be forced to pay tax on a project which would be in direct competition with its business.

●

DEED GRANTING Northwestern Electric Co. power rights on the White Salmon River near Goldendale, Wash., has been filed by Charles H. Thornton and the company.

●

WASHINGTON WATER POWER CO. has opened new headquarters in Clarkston, Wash.

●

SEATTLE CITY COUNCIL has appropriated an additional $771,603 for construction of Ruby Dam, transmission lines from the dam to the city and a South Seattle substation. The allotment, necessitated by the increased cost of labor and materials, brings the city's share of the construction budget to $7,956,602.

●

IN SPITE OF OPPOSITION by the Vancouver, B. C., Board of Trade, the city council has agreed to seek amendments to the city charter to permit the appointment of a board of examiners to pass on the qualifications of men applying for electrical contracting licenses. The Board of Trade's objection is based on the possibility of this amendment's creating a precedent which other industrial groups might follow.

●

WATER-POWERS OF CAMPBELL RIVER, Vancouver Island, one of the great potential sources of electricity on the British Columbia coast, have been reserved until Sept. 1, 1939 by the Vancouver Island Power Co., associate of the B. C. Electric Railway Co.

●

REA Activities

MORGAN COUNTY RURAL ELECTRIC ASSN., Fort Morgan, Colo., has awarded a contract to the Driscoll Construction Co., Pueblo, Colo., for building the first section of this project, consisting of 165 mi. of line, including substation. Bid was $166,625.

CENTRAL VALLEY ELECTRIC MEMBERSHIP CORP., Artesia, N. M., has awarded a contract to J. E. Morgan & Sons, El Paso, Tex., for building 80.6 mi. of distribution line. Low bid was $111,774.

WYRULEC CO., Lingle, Wyo., opened bids March 1 on construction of the second section of the project.

WASHAKIE RURAL ELECTRIC CO., Worland, Wyo., has received from REA an allotment of $6,500 to complete the project and defray expenses connected with initial operations.

GRAND VALLEY RURAL POWER LINES, INC., Grand Junction, Colo., has received from REA an allotment of $5,000 to complete the project and defray expenses connected with initial operations.

CLEARWATER VALLEY LIGHT & POWER ASSN., Lewiston, Ida., is to call for bids on 1,700 electric meters for installation on Unit 1 of the project. .

ROBERT W. HUNT CO., Seattle, has been awarded a pole inspection contract by REA. Work involves inspection on the 70-mi. power line of Orcas Power & Light Co., at East Sound, Wash.

INLAND EMPIRE RURAL ELECTRIFICATION ASSN., is to call for bids on construction of the 200-mi. third unit of the project.

IMPERIAL IRRIGATION DISTRICT, El Centro, Calif., last month celebrated the planting of the first pole. The district also awarded contracts as follows: To General Machinery Corp., Hamilton, Ohio, for equipment and construction of diesel electric generating units to triple capacity of the stand-by power plant at Brawley, $442,693; to Williams Bros. & Haas, San Francisco, for construction of 112 mi. of 33-kv. line; to Aluminum Co. of America; Electric Wholesale Mart, Los Angeles, and B. J. Garney & Co., Spokane, for equipment for line between All-American Canal hydro plants and Brawley.

●

Contracts Awarded

BY BUREAU OF RECLAMATION for main and auxiliary control equipment, load and frequency control equipment, battery distribution switchboard and auxiliary power control equipment for control of generating units A-6 and A-7 in Boulder power plant to Westinghouse Electric & Mfg. Co., $54,194; General Electric Co., $2,264, and Cutler-Hammer, Inc. $19,344.

TO COLLINS ELECTRIC CO., Fresno, Calif., by Tulare School District for electrical work in school and cafeteria unit. $6,318.

BY BUREAU OF RECLAMATION to Koppers Co., Baltimore, for bulkhead gate frames and track units, service penstocks and 18 complete gate frames for penstock inlet gates at inlet ends of power penstocks at Grand Coulee Dam. $468,000.

TO BARRETT & HILP, San Francisco, by California State Dept. of Public Works for constructing catenary and feeders of the railway facilities of the San Francisco-Oakland Bay Bridge, main bridge, San Francisco loop and East Bay yard. $370,285.

TO KELMAN ELECTRIC MFG. CO., Los Angeles, by Los Angeles Dept. of Water & Power for oil circuit breakers. $4,378.

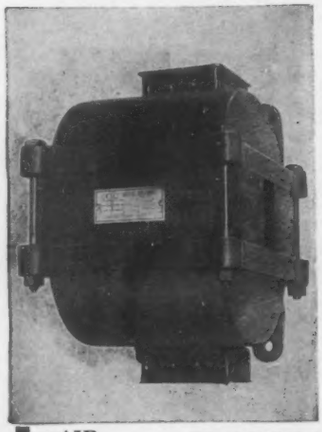
TO RELIABLE ELECTRIC CO., Denver, by the State of Colorado for electrical work on state penitentiary. $6,340.

TO WESTERN PIPE & STEEL CO., of California, San Francisco, by Bureau of Reclamation for 16,000,000 steel penstock pipes for Grand Coulee Dam. $1,456,624.

TO RAYMOND ELECTRIC CO., Tacoma, Wash., for electrical work in new Olympia, Wash., school. $10,820.

TO YORK ICE MACHINERY CO., by Security First National Bank, for air conditioning of eight-story Pacific Southwest Bldg., Pasadena, Calif. Approximately $80,000.

YOU SAVE



With JEFFRIES

AIR COOLED **TRANSFORMERS**

● With a Jeffries Air Cooled Transformer money can be saved. The Air Cooled construction lengthens the life of the transformer and lowers repair costs. Plant expansion and extension can be made economically for a Jeffries Transformer provides the voltage change at the point desired without the need of long and expensive conduit runs. Besides a complete line of standard transformers, special designs and voltage furnished to order. Type S. S. Transformer 1 to 5 K. V. A. illustrated.

JEFFRIES TRANSFORMER COMPANY
5706 LONG BEACH AVE., LOS ANGELES

Popular in over a hundred thousand American kitchens

CHROMALOX
Super-Speed
RANGE UNITS

Housewives demand them because of their speed, convenience, economy. Range manufacturers supply them because they sell ranges and cut servicing costs. *Specify them on the ranges you sell.*

Represented by

MONTGOMERY BROTHERS
911 Western Ave., Seattle, Wash.
1501 N. W. Kearny St., Portland, Ore.
61 Fremont St., San Francisco, Calif.
912 E. Third St., Los Angeles, Calif.

THE PETERSON COMPANY
1921 Blake St., Denver, Colo.

EDWIN L. WIEGAND CO.
7540 Thomas Blvd. Pittsburgh, Pa.

ABOUT PEOPLE

P. M. Parry Dies; Utah Power Reassigns Officers

P. M. Parry, vice-president and commercial manager of Utah Power & Light Co., died of heart disease Feb. 4 at his home in Salt Lake City. He was 58.

One of the leaders in Western electrical development, Mr. Parry began as an accountant with the old Utah Light & Railway Co., Ogden, in 1904; became treasurer of the Merchants Light & Power Co., Ogden, in 1911; Ogden division manager of Utah Power & Light in 1912, and commercial manager, with headquarters in Salt Lake City, in 1919. He was advanced to the vice-presidency in 1929.

Under Mr. Parry's management, Utah Power & Light received the George A. Hughes Award for electric range promotion, and national recognition for the early promotion of electric water heaters and the development to a practicable state of a home service advisory staff.

A former president of the Electrical League of Utah and the Northwest Electric Light & Power Assn., Mr. Parry was at the time of his death vice-president in Utah for the latter organization.

Result of Mr. Parry's death was a reassignment of duties among present officers of the power company and the Utah Light & Traction Co.

J. A. Hale, vice-president, assumed executive direction of commercial, power production and transmission departments of the former and relinquished direction of the transportation department of the latter. He was succeeded in the transportation position by George B. Thomas, vice-president.

R. H. Jones, power company treasurer, assumed full direction of the treasury and accounting department; Dr. Adam S. Bennion, assistant to the president, took on additional duties with respect to personnel and promotion of public service activities, and Roy H. Ashworth became general superintendent of the power company with supervision over the company's divisional organization, rates and statistical departments.

●

R. U. MUFFLEY, president of the Electric Club of Washington, has announced appointment of two committees as follows: Puyallup Fair Exhibit committee, R. J. Lidgate, chairman; J. R. Wells, M. P. Hotelling, Freeman C. Scharr, Archie P. Rider, William S. Gaunt, H. A. Patton and C. T. Bakeman; greeters committee, H. F. Mullaney and Tom S. Wood.

FROST & GERMAN

W. T. GERMAN, lighting salesman, Whittier office of Southern California Edison Co., nosed out by a close margin the other lighting salesmen of the company to win the W. L. Frost award plaque and a trip to Nela Park, Cleveland, for an advanced course in lighting. Second man was D. H. Miller, Jr., of Visalia; third, P. Chambers, of Huntington Park. Vice-president W. L. Frost made the presentation at a dinner, Feb. 18, after George Rankin, manager of lighting sales, and Frank Hansen, director, Western Institute of Light and Vision, had made a tour of divisions to check up on the five points by which the salesmen were rated, namely: (1) performance against quota, (2) treatment of layouts and recommendations, (3) method of keeping records, (4) consumer relations, (5) contractor relations.

●

R. T. Smalley Transfers to Arizona Edison

Ralph T. Smalley, former vice-president and director of Washington Gas & Electric Co. and manager of its Longview, Wash., division, has been named vice-president and general manager of Arizona Edison Co.

Succeeding Mr. Smalley as manager at Longview is Robert Protheroe, chief electrician at the Longview steam plant from the time it was put into service by Longbell Lumber Co. in 1924.

●

D. HUDSON, for a number of years operator of the Electrical Appliance Service, Vancouver, B. C., has retired from business.

●

FRANK HANSEN, director of the Western Institute of Light and Vision, is moving, and the institute headquarters with him, to a new electric home just completed at 3407 Lowry Rd., Los Angeles.

COOL PROFITS!

WITH G-E AIR CIRCULATORS

You can earn *big profits* by selling General Electric Air Circulators. This is your chance of the springtime!

Everywhere, there will be a summer demand for man-made aids to comfort. Supply this demand at *low cost* with rigidly built G-E Air Circulators. Quiet and economical, they offer lasting value—and they'll make lasting friends for you.

General Electric Air Circulators sell fast on demonstration. No complicated installation —just plug them in as you would an electric fan. You can sell a type of G-E Air Circulator for each and every purpose!

General Electric Air Circulators provide effective ventilation and circulation. They drive out hot air and odors — and pull in fresh, cool air.

The *Deluxe* model is particularly suitable for locations exposed to public view. If the establishment is large, or if constant smoke and odors necessitate more frequent air changes, suggest the *Giant*. The *Utility* model is adapted to attic installations, ceiling suspension or floor use — its closed construction makes it safe.

For positive springtime profits, handle General Electric Air Circulators. Write your General Electric Distributor today, or mail the coupon to the General Electric Company.

FOR: Restaurants • Dress Shops • Night Clubs • Offices Hospitals • Stores • Beauty Shops • Barber Shops • Laundries • Libraries • Dance Halls Waiting Rooms • Homes

GENERAL ELECTRIC
Air Circulator

General Electric Company
Air Conditioning Department
Division 1540
Bloomfield, New Jersey

Please send me complete information on G-E Air Circulator.

Signed .....

Street ..... City .....

Crapo
GALVANIZED PRODUCTS

Where strains and stresses are heaviest, where corrosion takes its greatest toll, *Crapo* Galvanized Steel Strand and Telephone Wire constantly are proving their outstanding superiority. The heavy, tenaciously bonded zinc coating, maximum tensile strength and correct ductility insure longer life and lower maintenance cost. Insist upon *Crapo* Galvanized Products for better performance under all conditions! Ask your Jobber or write direct!

INDIANA STEEL & WIRE CO.
MUNCIE, ♦ INDIANA

Crapo Galvanized Strand and Telephone Wire can be obtained readily in all standard grades and sizes.

MAYDWELL

Glass Insulators

All Standard Numbers For All Purposes

Made of high quality materials in a modern Pacific Coast plant producing an unusually tough glass to withstand all severe service conditions.

MAYDWELL & HARTZELL
INCORPORATED
Electrical Engineers and Manufacturers' Representatives
San Francisco Los Angeles Portland

Northwest Norge representatives who attended the recent Norge annual distributor convention in Detroit included (left to right) Ronald Ries, sales manager, Midland Implement Co., Billings, Mont.; Lee Cox, district manager in the Northwest, and Carl Rahn, Midland Implement Co.

HARRY MOORE, electrical contractor whose volume probably exceeded that of the field in Los Angeles last year, starts Mar. 11, on an extensive trip throughout Europe with Mrs. Moore. He plans to visit electrical and industrial exhibits in each country. "Cash discounts", he says are paying for his trip.

●

E. H. ADAMS, vice-president of the B. C. Electric Railway Co., has been re-elected president of the Evergreen Playground Assn. for the third consecutive year.

●

ARTHUR V. WYNNE, Casa Grande, Ariz., division manager for Arizona Edison Co., has been appointed to succeed Clark J. Wells as electrical engineer for the San Carlos project at Coolidge.

●

J. H. PENGILLY

JOSEPH H. PENGILLY, Los Angeles, first vice-president of Square D Electric Co. and general manager of the Western division, has been elected potentate of Al Malaikah temple of the Shrine.

ROBERT O. WEBSTER, sales engineer in the home office of Thermador Electric Mfg. Co., Los Angeles manufacturer of electric air and water heaters, has been appointed district manager of the Sacramento and Stockton district with headquarters in Sacramento. Frank Collins, Portland, has been appointed Northwest representative.

●

CLARK J. WELLS, chief electrical engineer for the U. S. Indian irrigation service in Coolidge, Ariz., has been named Western regional electrical engineer for the park service. Headquarters will be in Santa Fe, N. M.

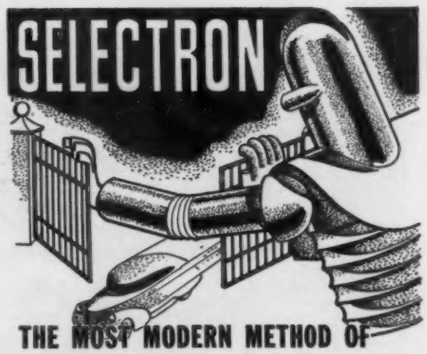
●

ATTENDING THE ANNUAL sales conference of James R. Kearney Corp. in St. Louis were six members of Maydwell & Hartzell: H. F. Hartzell, H. S. DeLancie, R. G. Harris, E. I. Hannah, H. B. Wells and W. J. Cottrell.

●

F. L. BOWRON, Electric Gas & Appliance Co., Casper, Wyo., has been elected president of the Casper Electrical League, branch of the R.M.E.L. He succeeds E. E. Saricks, Charles E. Wells Music Co. Program of the Casper league includes, in addition to sales activities, a campaign to eliminate radio static.

SELECTRON



THE MOST MODERN METHOD OF OPENING AND CLOSING GATES

. . . illuminating the drive and garage, as well as opening the Garage Doors without getting out of your car. SELECTRON fills a definite need of today for positive protection of Entrance Gates and Garage Doors and at the same time it eliminates any fear of molestation when entering or leaving.

● SELECTRON performance is constant regardless of weather conditions—once installed it requires no further adjustment. Selectron is not a tread switch, radio control, electric eye or sound wave and it has no tubes or transformers.

● For Entrance Gates or Garage Doors, Residential or Industrial, Selectron is the always on duty Robot. For positive protection and the utmost in modern convenience this inexpensive, mechanical operator pays for itself in a short period of time.

Get the complete story NOW—Use the coupon

SELECTRON CO. INC., 5525 Sunset Blvd.
Los Angeles, California Attention: EW

Without any obligation we would appreciate receiving the complete story of SELECTRON.

Name_____

Address_____

City_____ State_____

Maintenance Engineers Elect Warren President

H. S. Warren, maintenance engineer, Firestone Tire & Rubber Co., has taken office as the new president of the Electrical Maintenance Engineers Assn. of Southern California. He succeeded Walter E. Coburn of the Los Angeles Board of Education.

Other new officers are: C. C. Gifford, Los Angeles Shipbuilding & Drydock Co., vice-president, and C. F. Kimball, Ford Motor Co., secretary-treasurer. Board members are: Earl O. Miller, R.K.O. Studios, Inc.; Harold J. Hutt, Pacific Coast Borax Co.; R. Glen Woods, National Biscuit Co.; Carl Andre, National Tank & Mfg. Co.; C. M. Hoag, Union Oil Co.; and Thomas Hughes, Owens-Illinois Pacific Coast Co. Committee chairmen are: Mr. Woods, editorial; Mr. Hoag, educational; Mr. Hughes, membership; Mr. Gifford, program, and Mr. Andre, social.

●

HAROLD J. MERILEES of the merchandising executive division of the B. C. Electric Railway Co. has been appointed national chairman of the National Tourist Traffic Committee representing all Canadian junior boards of trade and junior chambers of commerce.

●

S. F. Electrical Contractors Re-elect Ryals President

Officers re-elected at the annual meeting of the San Francisco Electrical Contractors' Assn. were Kenneth Ryals, Stone-Ryals Electric Co., President; Louis Douat, Buzzell Electric Works, vice-president; Edward Martin, Sterling Electric Co., secretary, and George Smith, Smith Electric Co., treasurer. New members to the board of directors are Carl Severin, Tom Harris and Victor Lemoge.

Also voted was a change in the time of meetings: henceforth the first meeting of every month will be held at night.

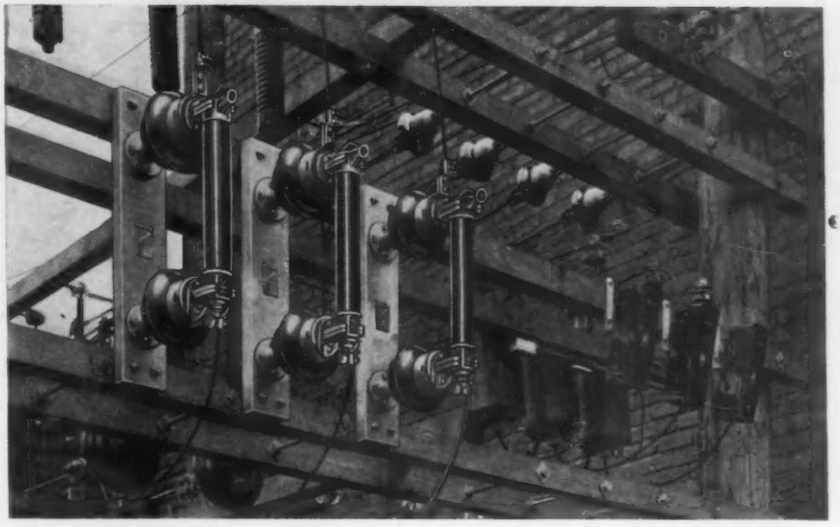
●

INCANDESCENT SUPPLY CO. has announced several organization changes: Eugene Mathes is now in charge of service and credits in the San Francisco office; Ralph Ninnis is covering the Fresno, Calif., territory; Peter Rossi is assistant to Manager Mel Plessing at Fresno, and S. T. Kleinberg, who has been selling from the inside for the Los Angeles office, is now an outside man.

●

CHARLES KIRK, formerly of Southern Colorado Power Co., is now manager of the appliance division, City of Burbank, public service department.

For Extra Heavy Short Circuit Duty Use "SM" FUSES

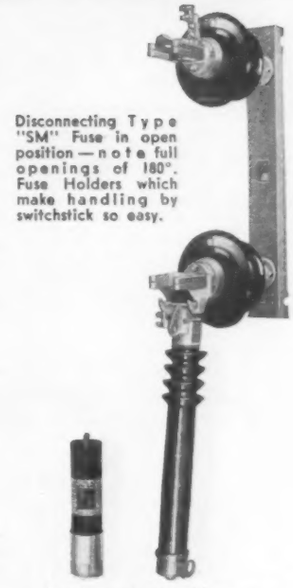


Typical Installation of Type "SM" Fuses

● Where very heavy duty might otherwise require more expensive circuit interrupting equipment—you can now provide reliable protection with type "SM" Fuses.

The fuse Refill Unit is self-contained—and replacement may be accomplished without use of special tools. . . . There are *no* soldered joints —fusible element is silver—with accurate time-current characteristics. The same as those available for the S & C Type D Liquid Fuses.

Type "SM" Fuses will give you dependable protection—at low initial and maintenance costs. . . . Let us mail our new Bulletin 200-E which gives you full data.



Disconnecting Type "SM" Fuse in open position — note full openings of 180°. Fuse Holders which make handling by switchstick so easy.

The fuse unit when blown may be easily replaced. Assembly and disassembly of fuse and fuse holder require no special tools.

EXPERIENCE WILL CHOOSE THE S & C FUSE

REG U.S. PAT OFF.

Type "SM" Fuses

SEND FOR BULLETIN 200-E.

WESTERN REPRESENTATIVES

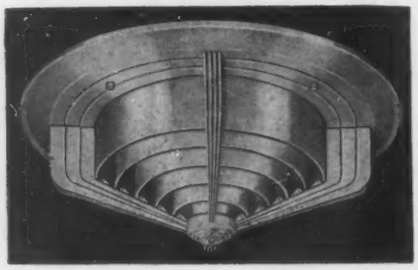
San Francisco: Geo. E. Honn, 420 Market Street
Los Angeles: Farnham & Cunningham, Edison Bldg.
Seattle: T. S. Wood, 220 Ninth Street, North
Salt Lake City: Riter Engineering Co., Kearns Bldg.

SCHWEITZER & CONRAD, Inc.

4435 RAVENSWOOD AVENUE . . . CHICAGO, ILLINOIS

Manufactured in Canada by Powerlite Devices, Ltd., Toronto, Can.

Here's the Fixture Merchants Want



Intense direct light at selling levels —on merchandise, shelves, displays —with diffused general illumination for eye comfort—that's the lighting merchants have long sought, and that's the lighting Ster-Lite Fixtures afford.

Alert contractors are finding Ster-Lite Fixtures the "Extra Value" that wins commercial lighting contracts. Get facts and figures—write for literature.

H. B. SQUIRES, Representative
Los Angeles—San Francisco—Seattle

REFLECTOR & ILLUMINATING CO.
1431 W. Hubbard St. CHICAGO

5 REASONS FOR AN AGENCY ACCOUNT

Our Agency Service has five outstanding advantages for anyone having a sizeable investment portfolio:

1. It relieves the client of all bookkeeping details and annoying routine.
2. It prevents losses due to mistakes, to delays in depositing dividends and collecting interest, to failure to observe redemption notices, etc.
3. It provides records helpful in preparing tax returns.
4. Its cost is moderate — frequently it pays for itself.
5. Flexible, it is adapted to the client's individual needs and operates under his direct authority.

TRUST DEPARTMENT

CROCKER FIRST NATIONAL BANK
of San Francisco

Changes Made in Pepco Merchandise Staff

In line with Portland General Electric Co.'s new sales policy, under which dealers will handle almost all merchandising activities while the company devotes itself largely to promotional work, changes have been made in the duties of merchandise executives.

George W. Madison, former merchandise manager, has been named manager of the new dealer promotion department, which will direct the activities of the home economics department, conduct cooperative sales campaigns and work with dealers.

Fred. Starrett, sales supervisor, now has charge of the company's reduced direct selling staff. George H. Card, manager of the company's Portland store, has taken on new duties in the customers' service department.

●

R. P. TOLLES, who has been appointed Pacific Coast manager of the National Carbon Co., Inc., succeeding the late C. B. Clendenen, has had a career with the company which dates back to 1919. Following his graduation from Yale University in 1915, he joined the old Franklin Lamp Works, leaving that

R. P. TOLLES

organization to enter the air service. His first position with National Carbon was as outside salesman in New York. In 1924 he was made assistant manager of the eastern division and later went to Pittsburgh in the same capacity for a year. Since 1930 he was successively sales manager and assistant manager at New York.

●

Forst Succeeds Bell in Vancouver Post

Alexander Forst, president of Forst's, Ltd., has been elected president of the electrical appliance and radio section of the Vancouver, B. C., Retail Merchants' Assn. He succeeds Langtry Bell, president for the past four years.

New executive committee includes F. L. Kennedy, Hudson's Bay Co.; R. A. Graham, Main Radio Co.; Clare Kelly, J. W. Kelly Piano Co.; A. G. Meekison, Clarkson's, Ltd.; Sidney Thompson, Sidney Thompson, Ltd.; Howard Walters, B. C. Electric Railway Co., and J. Drain, Woodwards, Ltd.

●

E. F. PEARSON, chief engineer of Northwestern Electric Co., returned last month from the mid-winter convention of the A.I.E.E. in New York. General chairman for the Pacific Coast convention of the A.I.E.E., he was representative of the Ninth District on the nominating committee.

●

Deaths

LEO BRANDENBURGER, prominent manufacturer's representative at Salt Lake City, died suddenly Feb. 11 while vacationing at Long Beach, Calif. Distribution engineer for the Telluride Power Co. from 1904 until 1912 and for the next two years in the engineering department of the Utah Light & Power Co., he set up his own business in 1914 as a sales representative for various manufacturers of utility equipment. At the time of his death he represented among others, the Wagner Electric Corp., James R. Kearney Corp., Cutler-Hammer, Inc., Simplex Wire & Cable Co., Delta-Star Electric Co. and Jeffery-Dewitt Insulator Co.

FRANK O. BROILI, electrical contractor, engineer and pioneer of Reno, died in San Francisco, Feb. 18, of a heart ailment that had bothered him for some years. About a year ago he turned over his interests in the Nevada Electric and Machinery Co., a contractor-dealer establishment in Reno of which he had been owner for years, to his brother, and became construction superintendent on the new power line from Boulder Dam to Pioche, Nev. At one time he was engineer for the Nevada Public Service Commission, and prior to that built some of the early power plants on the Truckee river, in Tonapah, Elko, Wells, and Winnemucca.

STANLEY G. HATTO, Puget Sound Power & Light Co. electrical engineer and an active member of the Electric Club of Washington, was found dead in his automobile in the garage at his Seattle home Feb. 2.

ROBERT A. CONNOR, Los Angeles district manager of Inca Mfg. Division of Phelps Dodge Copper Products Corp., died last month of cerebral hemorrhage. An electrical engineer of broad experience, Mr. Connor had contributed extensively to X-ray and transformer developments.

Speakers

At the last two meetings of the Electrical Maintenance Engineers Assn. of Southern California—Julien H. Davis, Los Angeles Bureau of Power & Light: "The varied applications of electricity in the Wilmington old field;" C. M. Hoag, Union Oil Co.: "Comparative costs of electric drive and process steam drive in oil refinery operation;" L. S. Peterman, Southern California Edison Co.: "Increased use of electricity in the petroleum industry" (excerpts from these papers will appear in later issues of Electrical West); Charles E. Morton, Master Lubricants Co.: Introduction of the G-E film showing lubrication of ball bearing motors.

At a meeting held by Canadian General Electric Co. for British Columbia refrigeration engineers—S. E. Irskine, contract manager of the service department of Canadian G-E; D. C. Van Horne, commercial refrigeration and air-conditioning department; M. Irvine, G-E refrigeration engineer, Cleveland; C. Coulter, G-E Pacific Coast products engineer.

At the Feb. 10th meeting of the Purchasing Agents Assn. of Los Angeles—J. M. Gaylord, chief electrical engineer, Metropolitan Water District, Los Angeles: "Electrical and mechanical features of the district's aqueduct;" Walter L. Stickel, department of adequate wiring design, Electrical Development League of Southern California: "Today It's Electric."

Dr. W. A. Lewis, Westinghouse Industrial Engineering Dept. of East Pittsburgh: "Symmetrical Components"—before A.I.E.E. Stanford Branch, San Francisco Section, Seattle Section, Spokane Section, Portland Section; University of California Electrical students.

W. A. Copley, Westinghouse Pacific Engineering Manager: "Mt. Palomar Telescope"—before P. G. & E. service group in Oakland. "Electrostatic air cleaner"—before Oakland Electric Club and San Francisco Heating & Ventilating Engineers; also before Portland Section, A.I.E.E., April 12; Spokane Section, A.I.E.E., April 15; Seattle Section, A.I.E.E., April 19.

At a one-week sales conference for 400 sales representatives, division managers and district representatives of Utah Power & Light Co., Western Colorado Power Co. and Bountiful Light & Power Co.—James M. Ketch, General Electric lighting specialist, Nela Park, Ohio; J. A. Hale, Utah Power & Light vice-president; Jacob A. Kahn, manager, G-E Supply Corp., Salt Lake City; M. L. Cummings, Utah Power & Light director of advertising; E. O. Larson, Bureau of Reclamation district engineer; Dr. Adam S. Bennion, assistant to the president, Utah Power & Light;

THERE ARE "BESTS" IN EVERY INDUSTRY

IN ELECTRICAL APPLIANCES IT'S

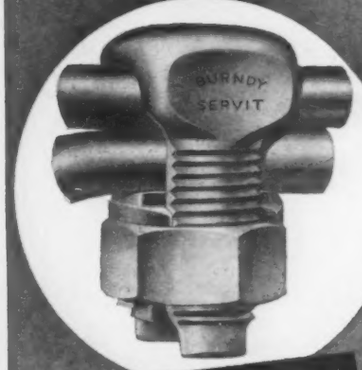
Sunbeam

★ Automatic MIXMASTER ★ Double-Automatic IRONMASTER ★ Silent AUTOMATIC TOASTER ★ COFFEEMASTER ★ WETPROOF HEATING PAD ★ MASTER CORD and PLUG SET ★ GLASS COFFEE MAKERS FANHEATER ★ FLAT TOASTER ★ Automatic CLOTHES SPRAYER.

Made and guaranteed by

CHICAGO FLEXIBLE SHAFT COMPANY
5600 West Roosevelt Road, Chicago, Ill.
316 Commercial St., Los Angeles, Cal.
921 11th Ave. N., Seattle, Wash.
224 S. W. Temple St., Salt Lake City, Utah
47 YEARS MAKING QUALITY PRODUCTS

FORGED-IN STRENGTH



BURNDY SERVIT

BURNDY ENGINEERING CO., INC.

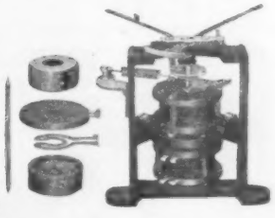
● *REPRESENTED BY:*
Condon & Young, Los Angeles, Cal.
C. E. Ingalls, San Francisco, Cal.
Peterson Co., Denver, Colo.
F. W. Carlson, Seattle, Wash.

LINCOLN DEMAND METERS

Simple in Construction

TYPE WD

As simple in construction as an ordinary indicating meter. The chief difference is that, the Lincoln Demand Meter is time lagged to a large degree, while an ordinary indicating meter is practically instantaneous.



View of actuating element and parts

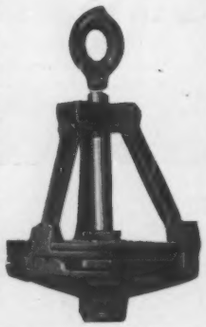
LINCOLN METER COMPANY
SPRINGFIELD, ILLINOIS

B. L. Sackett, superintendent of the Tooele plant, International Smelting & Refining Co.; Karl Klingler, rural specialist for the Rexburg, Idaho, division, Utah Power & Light; William Peterson, and Hobart Beresford.

New nut housing. Locks Anchor firmly on rod. Rod cannot slip thru Anchor when being installed.

EVERSTICK ANCHORS...

Engineers appreciate Everstick features which assure safety, long life and ease of installation in any soil condition. A complete line of 3 types of expanding Anchors and rigid types of Cone Anchors. All sizes and holding capacities. Write for Everstick literature including new folder on Rural Electrification Lines.



EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

PROFESSIONAL SERVICES

ELECTRICAL TESTING LABORATORIES
Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.
80th St. and East End Ave., New York

TRADE NOTES

H. & H. Products to be Distributed by Factory

Distribution of products of the Hart & Hegeman division of the Arrow-Hart & Hegeman Electric Co. in the West was passed over to the factory organization effective March 1 as a result of changes effected by G. C. Barry, vice-president and sales manager, who has been visiting the Pacific Coast offices. Heretofore distribution was through Garnett Young & Co.

No changes in policy will be occasioned by the new arrangement. Complete stocks of H & H wiring devices will be maintained at 1345 Howard St., San Francisco, and 405 E. Third St., Los Angeles, for meeting the requirements of wholesalers. Sales will be under the direction of S. B. Gregory and Carl J. Sachs in the respective cities.

Provision has been made for an extensive adequate wiring campaign by the company which will revolve around a 16-page rotogravure booklet entitled "Your Home With Adequate Wiring." This will be made available to electrical contractors for distribution to prospective home builders.

●

BAKER'S HOME APPLIANCE CO., Huntington Park, Calif., has opened a branch store at 936 W. Manchester, Los Angeles.

●

ARC ELECTRIC CO., 4792 Mission St., San Francisco, has enlarged its quarters.

●

F. B. CONNELLY CO., Seattle and Portland, has been appointed distributor of Emerson radio products in Oregon and western Washington.

●

RADIO STUDIOS, INC. has added a wholesale department in its Salt Lake City store.

E. C. CRANSTON, general manager of Utility Illuminating Co., has announced the moving of the firm's I.E.S. lamp manufacturing headquarters to 230 Madison Ave., Oakland, and the appointment of Les Baxter, Portland, as Northwest agent; James Edwards, Vancouver, B. C., as Dominion of Canada agent.

●

ARTCRAFT RADIO SHOP, Montpelier, Utah, has taken on the complete Stewart-Warner line.

●

HARRIS APPLIANCE & SERVICE SHOP has been opened by Everett Harris at 2470 Washington Ave., Ogden, Utah. The store handles the A.B.C. washer and sells parts for all makes of washers and vacuum cleaners.

●

INDUSTRIAL ELECTRIC CO., Seattle, last month became Northwest agent for Nash-Kelvinator refrigerators and air conditioning systems.

●

THOMAS J. O'REILEY has opened a new refrigerator and vacuum cleaner service and sales shop at 186 W. Manchester, Los Angeles.

●

HOME ELECTRIC APPLIANCE CO., Moscow, Ida., has been opened for business by C. L. Lundquist. Gibson refrigerators, Arvin radios and Auto-Matic washers and ironers are carried.

●

FRANK H. BRAN CO., San Francisco and Los Angeles, has been named Pacific Coast representative for Colt-Noark Products.

●

COMPLETE MODEL KITCHEN is being installed in the electrical department of the Z.C.M.I., Salt Lake City department store. Scheduled by the department for March and April is a drive on L. & H. ranges and water heaters.

●

PETERS ELECTRIC CO., specialists in vacuum cleaners, repairs and parts, is moving to its own building at 12230 Ventura Blvd., North Hollywood, after May 1.

●

GAMBLE STORES, INC., has opened a store in Evanston, Wyo. Carried are ranges, refrigerators, radios, washers and small appliances. G. W. Sewright is in charge.

●

R. S. POWELL APPLIANCE CO., Magna, Utah, has taken on a line of L. & H. water heaters, G. E. radios, lamps and other small appliances.

●

M. L. ROWAN has discontinued business in Idaho Falls, Idaho, and is stocking a full line of Hotpoint equipment at Ririe, Idaho.

Geo. E. Honn Co.
420 MARKET STREET
SAN FRANCISCO, CALIFORNIA

MANUFACTURER'S REPRESENTATIVE FOR:

TREE TRIMMING EQUIPMENT
● BARTLETT MANUFACTURING CO.
FRICTION AND RUBBER TAPES
● CLIFTON MANUFACTURING CO.
CROMPTON TONG TEST AMMETER
● COLUMBIA ELECTRIC MFG. CO.
PYREX INSULATORS
● CORNING GLASS WORKS
● BREWER-TITCHENER HARWARE
TRANSFORMERS
● GARDNER ELECTRIC MFG. CO.
Power and Distribution Transformers
● LEE SKIPWITH & CO., INC.
Niagara Air-Insulator Current Tran-formers
CABLE GRIPS
● KELLEMS PRODUCTS, INC.
GROUNDLINE POLE TREATMENT
● OSMOSE CORP. OF AMERICA
CONNECTORS, GROUND ROD CLAMPS, UTILITY HOISTS
● JASPER BLACKBURN PRODUCTS CORP.
METERING INSTRUMENTS
● LANDIS & GYR., INC.
NEON MULTIPLE PLUG FUSE
● PACIFIC INDICATOR CO.
FUSES, CUTOUTS, PROTECTIVE DEVICES
● SCHWEITZER & CONRAD, INC.
UNDERGROUND TOOLS AND EQUIPMENT
● T. J. COPE, INCORPORATED
CAPACITORS
● CORNELL-DUBILIER CORP.
World's Largest Exclusive Mfrs. of Capacitors

"Yours for Quick Service, Reliable Products, Local Stocks"

NEW KELVINATOR DISTRIBUTORS in the West are Barry Hardware Co., Clovis, N. M.; Underwood & Wellman, Salinas, Calif.; Refrigeration Products Corp., Los Angeles; Charles A. Merritt & Son, San Jose, Calif., and Kelso & Fitton Co., Long Beach, Calif.

●

CARL SPRECK APPLIANCE SHOP is a new Maytag washer and ironer sales and service store opened at 2814 Firestone Blvd., South Gate, Calif.

●

NEW FURNITURE STORE at Eureka, Utah, handles ABC washers, Frigidaire and Bendix appliances.

●

THOMPSON SPORTING GOODS CO., Rexburg, Idaho, plans to add ranges, refrigerators and other appliances to its line of merchandise.

●

SPRAGUE HARDWARE & IMPLEMENT CO., Spokane, has been bought by Leo McCutcheon and Guy M. Munson.

●

MULLENBACH ELECTRICAL MANUFACTURING CO., 1116 East 16th St., Los Angeles, has recently been appointed exclusive southern California and Arizona distributor for Clark Controller Co., of Cleveland, Ohio, and of Sorgel Electric Co., Milwaukee, (transformers).

●

LOS ANGELES BUREAU OF POWER & LIGHT is constructing a new district office at 2417 Daly St. When completed, the office will serve the Lincoln Heights and Sierra Vista districts.

●

V. T. RUPP, Los Angeles manufacturers' representative, has been appointed southern California representative for Economy Electric Hand Lanterns, Chicago.

●

L. C. MARSCHALL, Sola Electric Co., Chicago, on a recent trip through the Pacific West, appointed Marsh Sales Agency, Los Angeles, Sola representative in southern California; Frank D. Fagan Co., San Francisco, representative in northern California.

●

Moved

BARKER-ALLEN ELECTRIC CO., from 1607 N. Cahuenga Blvd., Hollywood, Calif., to new store at 1624 N. Cahuenga Blvd.

VANCOTT CO., electrical contractors, from 4921 W. 20th St., Los Angeles, to new shop at 5024 W. Washington St., Los Angeles.

MIDLAND COUNTIES PUBLIC SERVICE CORP., from 1118 Morro St., San Luis Obispo, Calif., to 894 Monterey St.

PINSON ELECTRIC CO., Preston, Utah, to new quarters.

the THAW IS HERE!

Through the winter, G-E national advertising has been building up demand which is ready now to be turned into sales.

Customers you may not have seen in months have felt the force of this demand — have left other stores because they didn't carry General Electric Heating Devices.

These customers are "thawed out" and looking to you — for a chance to see the new General Electric Heating Devices.

Remember — no other brand of heating devices means so much to customers as the General Electric Line. You can sell every heating device they need produced by one manufacturer, finished and styled to perfection and backed by one uniform, straight-forward guarantee.

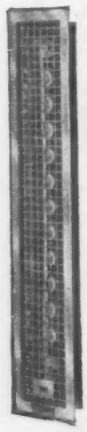
SALES HINT-OF-THE-MONTH

The Bisquick Contest has been flourishing for several weeks. Thousands of grocery stores have tied-in with the Bisquick Contest featuring the G-E Roanoke Waffle Iron. Bisquick daily broadcasts have featured this mammoth promotion for five weeks. 4,000 General Electric Roanoke Waffle Irons will be given away as prize awards. Non-winning contestants will receive certificates of $1.00 value toward the purchase of a General Electric Roanoke Waffle Iron. Plan now to redeem your share of these certificates. Display the Roanoke Waffle Iron with the Bisquick poster. Make sure your stock of this waffle iron is adequate.

GENERAL ELECTRIC

NEW PRODUCTS

Bathroom Heaters



Wesix Electric Heater Co. has announced two built-in bathroom heaters. The "Bilt-In," 20-in. high, is designed for the average size home; the "Forty-Niner," 49-in. high, is for larger rooms.

●

Calculator

To enable prospective lamp customers to appreciate the costliness of inferior lamps is the function of a simple calculator in slide-rule form originated by General Electric Co. Under the appropriate local rate for energy, found on the first scale, the operator sets the figure on the next scale representing the percent reduction in light efficiency realized through use of the inferior lamp. Other windows then show, for various sizes of lamps, what percent discount the purchaser should realize in first cost of the inferior lamp in order that his cost of light be not increased. The calculator drives home the insignificance of lamp discount, the importance of lamp efficiency.

●

Cord Set

Molded, and permanently sealed in rubber, in one piece, is a cord set for irons and other heating appliances announced by General Electric Appliance and Merchandise Dept. The cord, attachment plug, strain relief and heater-plug are molded together and copper conductors and contacts are welded. Protective casings are riveted. The strain relief contains no spring, eliminates strain on contact by being built of rubber molded to the cord and plug.

Surface Luminaire

Ster-Lite surface-mounting units for installation on finished plaster ceilings or in other places where semi-recessed units are impractical have been announced by Reflector & Illuminating Co. Made in one size for 300 to 500-watt lamps.

●

Industrial Spotlight

Intensifier is the name given by Benjamin to a new industrial spotlight, capable of producing nearly 1,000 ft.-candles on restricted vertical or horizontal surfaces. Glare is reduced to a minimum by dead-black removable, internal louvers. Addition of daylight glass cover raises color temperature to 4,200 deg. Kelvin, and further addition of a 300-watt daylight lamp permits correction to 5,300 deg. Adjustable focus models are available from 60 to 200 watts medium base; fixed focus, 300 to 500 watts, mogul base.

●

Display Device

Teletouch Magic Switch is a new device designed to increase the value of window displays by day and save on the use of electricity by night. Introduced by Magic Mirror Corp., the unit comprises a window sign surrounded by a field of radio waves penetrating 6 in. through the glass and a control box 7 x 7 x 7 in. Spectators who follow the sign's instructions and wave their hand in front of the spot from which the radio waves emanate thereby start an action display of the appliance to which the machine is attached. When hand is withdrawn the action stops. Window lights at night can be turned on and off similarly.

●

Line Starters

Designed primarily for application in the petroleum and chemical industries are Westinghouse high-voltage type DNO line starters, which are completely oil-immersed and corrosion resisting. Available in a wide range of ratings, the units are designed for either floor or frame mounting.

PRODUCT DATA

Free to you . . . Any of these instructive bulletins simply by addressing a post card to ELECTRICAL WEST and asking for the desired bulletin by number.

301:
ILLUMINATING GLASSWARE; for use in all kinds of buildings catalogued. Kopp Glass, Inc.

302:
WIRING DEVICES; two catalogues. Arrow-Hart & Hegeman Electric Co.

303:
LUMINAIRES FOR HEAVY INDUSTRIES; leaflet giving application data and various tests which illustrate ability of unit to withstand abuse. Westinghouse.

304:
SUMMER AIR CONDITIONING UNIT; description, illustrations, installation and specifications. Pleasantaire Corp.

305:
MESSENGER STRAND for aerial cable construction; booklet detailing applications and installations. Copperweld Steel Co.

306:
LUMINAIRES for use on modern store lighting; illustrated leaflet. Reflector & Illuminating Co.

307:
HOTPOINT ELECTRIC RANGES; richly colored and illustrated 44-page catalogue. Edison General Electric Appliance Co.

308:
INSULATORS, petticoat, smooth disc, smog and clamptop types; control gaps, and bushings described in January "Hi-Tension News." Ohio Brass Co.

309:
A. C. GENERATORS for diesel engine drive; 16-page booklet giving illustrations of installations and construction details and full descriptive material. Westinghouse.

WHERE TO BUY IN THE WEST

G.C.A.
Lamp Replacers
Lamp base Removers
Cartridge Fuse Tongs
Switch Hooks

Send for Catalogue

We have been making safety tools for 20 years

The G. C. A. Manufacturing Co.
Pittsfield, Mass.

Air Conditioning
Frigidaire Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
Kelvinator Corp.
Norge Division, Borg-Warner Corp.

Ammeters and Voltmeters
Ferranti Elec., Inc.
General Elec. Co.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec. Instr. Corp.

Anchors, Guy
A. B. Chance Co.
Everstick Anchor Co.
Hubbard & Co.
James R. Kearney Corp.
W. N. Matthews Corp.

Anchor and Guy Rods
A. B. Chance Co.
General Elec. Co.
Hubbard & Co.
Maydwell & Hartzell, Inc.

Appliances, Household
Chicago Flexible Shaft Co.
Easy Washing Machine Corp.
Edison General Elec. Appliance Co., Inc.
Frigidaire Division
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Kelvinator Division
Landers, Frary & Clark
Leonard Division
Malleable Iron Range Co.
National Enameling & Stamping Co.
Noblitt-Sparks Industries, Inc.
Norge Division
Standard Elec. Mfg. Corp.
The Silex Co.
Utility Electric Co.
Thermador Elec'l Mfg. Co.
Wesix Elec. Heater Co.
Westinghouse Elec. Supply Co.
The Woolwine-Norris Corp.

Boxes
General Cable Corp.
General Elec. Co.
Superior Switchboard & Devices Co.

Brackets, Wood
Locust Pin Co.

Breakers

Air Circuit Breakers
Electric Material Co.
General Elec. Co.
I-T-E Circuit Breaker Co.
Roller-Smith Co.
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.

Oil Circuit Breakers
Allis-Chalmers Mfg. Co.
Electric Material Co.
General Elec. Co.
Pacific Elec. Mfg. Corp.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.
Line Material Co.
Pacific Elec. Mfg. Corp.

Bus Fittings
Burndy Eng'g Co.
General Elec. Co.

Buses
Aluminum Co. of America

Bushings
General Elec. Co.
Lapp Insulator Co., Inc.
Locke Insulator Corp.
Ohio Brass Company
Westinghouse Elec. & Mfg. Co.

Cable Accessories
General Cable Corp.
General Elec. Co.
John A. Roebling's Sons Co.

Cables
Aluminum Co. of America
American Steel & Wire Co.
Columbia Steel Co.
Crescent Ins. Wire & Cable Co.
Crucible Steel Co. of America
General Cable Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
Hazard Ins. Wire Works
Indiana Steel & Wire Co.
Maydwell & Hartzell, Inc.
The Okonite Co.
Okonite-Callender Cable Co.
Providence Insulated Wire Co.
John A. Roebling's Sons Co.
Triangle Conduit & Cable Co., Inc.
United States Steel Corp.
Westinghouse Elec. & Mfg. Co.

Carbon Brushes
National Carbon Co., Inc.
Union Carbide & Carbon Corp.

Carbon Products
National Carbon Co., Inc.
Union Carbide & Carbon Corp.

Chimes
Square D Co.

Clamps, Ground
B. Hartman
Reliable Elec. Co.

Clocks, Program
Tork Clock Co., Inc.

Coffee Makers
The Silex Co.

Coil Winding
Jeffries Transformer Co.

Commutator Dressers
Ideal Commutator Dresser Co.

Compounds, Insulating
Clifton Mfg. Co.
John C. Dolph Co.
General Cable Corp.
General Elec. Co.
Irvington Varnish & Insulator Co.

Condensers, Electric
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Conduit
Aluminum Co. of America
General Elec. Co.
Triangle Conduit & Cable Co., Inc.
Youngstown Sheet & Tube Co.

Conduit, Flexible Metallic
General Elec. Co.
Triangle Conduit & Cable Co., Inc.
Wiremold Co.

Conduit, Underground
Johns-Manville Corp.

Connectors
Burndy Eng'g Co.
Electric Power Equip. Corp.
G & W Elec. Specialty Co.
James R. Kearney Corp.
W. N. Matthews Corp.
Reliable Elec. Co.
L. W. Thompson

Controllers
Allis-Chalmers Mfg. Co.
Betts & Betts Corp.
General Elec. Co.
Square D Co.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg. Co.

Cutouts
G & W Elec. Specialty Co.
General Elec. Co.
James R. Kearney Corp.
Line Material Co.
W. N. Matthews Corp.
Pacific Elec. Mfg. Corp.
Schweitzer & Conrad, Inc.
Westinghouse Elec. & Mfg. Co.

Demand Control
General Elec. Co.
Wesix, Inc.

Distribution Specialties
G & W Elec. Specialty Co.
General Elec. Co.
Hubbard & Co.
James R. Kearney Corp.
Maydwell & Hartzell, Inc.
Ohio Brass Company
St. Louis Malleable Casting Co.
Superior Switchboard & Devices Co.

Electrodes, Arc Welding
General Elec. Co.
John A. Roebling's Sons Co.

Enclosures, Meter and Instrument
Superior Switchboard & Devices Co.

Fans
General Elec. Co.
Kisco Co., Inc.
Smallcomb Elec. Co.

Farm Electrification Equipment
General Elec. Co.

Fittings, Conduit
General Elec. Co.
B. Hartman
Killark Elec. Mfg. Co.

Fittings, Insulator
Brewer-Titchener Corp.
Ohio Brass Company

Fixtures, Lighting
Benjamin Elec. Mfg. Co.
Curtis Lighting, Inc.
General Elec. Co.
Pittsburgh Reflector Co.
Smoot-Holman Co.
Westinghouse Elec. & Mfg. Co.

Floodlighting
Curtis Lighting, Inc.
General Elec. Co.
Pittsburgh Reflector Co.
S & M Lamp Co., Inc.
Smoot-Holman Co.
Westinghouse Elec. & Mfg. Co.

Generators
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Graphite Products
National Carbon Co., Inc.
Union Carbide & Carbon Corp.

Ground Rods
Maydwell & Hartzell, Inc.

Heaters, Air
Edison Gen. Elec. Appliance Co.
Noblitt-Sparks Industries, Inc.
Thermador Elec'l Mfg. Co.
Wesix Elec. Heater Co.
Edw. L. Wiegand Co.

Heaters, Water
Edison Gen. Elec. Appliance Co.
Electro Hot Heater Co.
Standard Elec. Mfg. Corp.
Thermador Elec'l Mfg. Co.
Wesix Elec. Heater Co.
Westinghouse Elec. & Mfg. Co.
The Woolwine-Norris Corp.

Heating Element—Repair Part
Edw. L. Wiegand Co.

Instruments, Measuring and Recording
See Ammeters, Voltmeters, Wattmeters.

Insulation
General Elec. Co.
Irvington Varnish & Insulator Co.
Johns-Manville Corp.

Insulators
Brewer-Titchener Corp.
Corning Glass Works
Graybar Elec. Co., Inc.
Hemingray Glass Co.
Geo. E. Honn Co.
Lapp Insulator Co., Inc.
Locke Insulator Corp.
Maydwell & Hartzell, Inc.
Ohio Brass Company
Owens-Illinois Glass Co.
Westinghouse Elec. & Mfg. Co.

Ironers
Easy Washing Machine Corp.
Edison Gen. Elec. Appliance Co.
General Elec. Co.
Norge Division, Borg-Warner Corp.
Westinghouse Elec. & Mfg. Co.

Knobs, Tubes, Cleats
Standard Elec'l Porcelain Mfrs.

Lamp Guards
McGill Mfg Co.

Lamp Replacers
G. C. A. Mfg. Co.

Lamps, I. E. S.
General Elec. Co.

Lamps, Mazda
General Elec. Co.
Westinghouse Lamp Co.

Lamps, Sun
General Elec. Co.

Lighting Equipment
Benjamin Elec. Mfg. Co.
Curtis Lighting, Inc.
Kim Mfg. Co.
Smoot-Holman Co.
Westinghouse Elec. & Mfg. Co.
Wuelker Lighting Co.

Line Material
Maydwell & Hartzell, Inc.
Ohio Brass Company

Meters
General Elec. Co.
Lincoln Meter Co.
L. A. Nott
Roller-Smith Co.
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Corp.

Motors
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Motor Starters
Allis-Chalmers Mfg. Co.
General Elec. Co.
Square D Co.
Westinghouse Elec. & Mfg. Co.

THIS SPEED REGULATOR IS COMPACT and STAYS COOL

The well planned arrangement permits circulation of air around resistance elements to dissipate the generated heat. The Ward Leonard Speed Regulator therefore, in spite of its compact design, will operate continuously at lowest speed without overheating. It is the ideal control for fan and machine duty, especially where space is limited. *SEND FOR NEW BULLETIN NO. 1101.*

REPRESENTATIVES

Raymond Ackerman, 318 Dooly Block, Salt Lake City, Utah
A. R. Slimmon, 443½ East 3rd Street, Los Angeles, Calif.
Northwestern Agencies, 3224 Western Avenue, Seattle, Washington
Electric Material Co., 163 2nd Street, San Francisco, Calif.

WARD LEONARD

48 SOUTH STREET, MOUNT VERNON, N. Y.

Electric Control Devices Since 1892

Oil, Lubricating
Shell Oil Co.
The Texas Co.

Oil, Transformer & Switch
General Elec. Co.
Shell Oil Co.
The Texas Co.

Panel Boards
General Elec. Co.
Square D Co.
Superior Switchboard & Devices Co.
Westinghouse Elec. & Mfg. Co.

Photoelectric Cells
General Elec. Co.
Weston Elec'l Instrument Corp.

Pins, Wood
Locust Pin Co.

Pole Line Hardware
Brewer-Titchener Corp.
General Electric Supply Corp.
Graybar Electric Co., Inc.
Hubbard & Company
Joslyn Co. of California
Kortick Mfg. Co.
Maydwell & Hartzell, Inc.
Ohio Brass Company

Porcelain
Standard Elec. Porcelain Mfrs.

Public Utilities
California Oregon Power Co.
Idaho Power Co.
The Montana Power Company
Mountain States Power Co.
Northwestern Electric Co.
Pacific Gas and Electric Co.
Pacific Power & Light Co.
Portland General Electric Co.
Puget Sound Power & Light Co.
San Diego Cons. Gas & Elec. Co.
San Joaquin Light & Power Corp.
Southern California Edison Co. Ltd.
Utah Power & Light Co.
Washington Water Power Co.

Pullers, Slack
A. B. Chance Co.

Pumps
Pelton Water Wheel Co.

Range Units
Edison Gen. Elec. Appliance Co.
Edwin L. Wiegand Co.

Ranges
Edison Gen. Elec. Appliance Co.
General Elec. Co.
General Elec. Supply Corp.
Kelvinator Corp.
Landers, Frary & Clark
F. S. Lang Mfg. Co.
Malleable Iron Range Co.
Norge Division, Borg-Warner Corp.
Standard Elec. Mfg. Corp.
Westinghouse Elec. & Mfg. Co.
The Woolwine-Norris Corp.

Reflectors
Benjamin Elec. & Mfg. Co.
Curtis Lighting, Inc.
Pittsburgh Reflector Co.
Reflector & Illuminating Co.
Smoot-Holman Co.
Westinghouse Elec. & Mfg. Co.
Wuelker Lighting Co.

Refrigerators
Edison Gen. Elec. Appliance Co.
Frigidaire Corp.
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Kelvinator Corp.
Leonard Refrigerator Co.
Norge Division, Borg-Warner Corp.
Westinghouse Elec. & Mfg. Co.

Relays
General Elec. Co.
Roller-Smith Co.
Square D Co.
Ward Leonard Elec. Co.

Rheostats & Resistors
General Elec. Co.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg. Co.

Roasters
National Enameling & Stamping Co.
Westinghouse Elec. & Mfg. Co.

Rural Line Hardware
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Hubbard & Co.
Joslyn Co. of Calif.
Kortick Mfg. Co.
Maydwell & Hartzell, Inc.
Ohio Brass Company

We Are Pleased to Announce the Appointment of

The Frank H. Bran Co.

of

San Francisco and Los Angeles

as Pacific Coast Representatives

for

COLT-NOARK PRODUCTS

Effective February 15, 1938

COLT'S PATENT FIRE ARMS MFG. CO.
ELECTRICAL DIVISION
HARTFORD, CONN.

Service Organizations
Brookmire Corp.
Crocker First National Bank
Elec'l Testing Labs.
McGraw-Hill Book Co.
Northwest Elec. Light & Power Association
Pacific Coast Elec'l Bureau
Pacific Coast Elec'l Ass'n

Strand, Guy
Maydwell & Hartzell, Inc.
Pacific Wire Rope Co.

Street Lighting Fixtures
General Elec. Co.
Graybar Elec. Co., Inc.
Hubbard & Co.
Line Material Co.
Westinghouse Elec. & Mfg. Co.

Switchboards
Allis-Chalmers Mfg. Co.
General Elec. Co.
Roller-Smith Co.
Square D Co.

Switches, Disconnect
Electric Power Equip. Corp.
General Elec. Co.
Kearney Corp., James R.
Line Material Co.
Pacific Elec. Mfg. Corp.
Schweitzer & Conrad, Inc.
Westinghouse Elec. & Mfg. Co.

Switches, Fuse
General Elec. Co.
Kearney Corp., James R.
Pacific Elec. Mfg. Corp.
Schweitzer & Conrad, Inc.

Switches, Heater
General Elec. Co.
Hart Mfg. Co.

Switches, High Tension
Bowie Switch Co.
James R. Kearney Corp.
Pacific Elec. Mfg. Co.

Switches, Meter Test
General Elec. Co.
Square D Co.
Superior Switchboard & Devices Co.

Switches—Pressure and Temperature
Square D Co.

Switches, Remote Control
General Electric Co.
Hart Mfg. Co.
Roller-Smith Co.

Switches, Safety
Colt's Patent Fire Arms Mfg. Co.
General Elec. Co.
McGill Mfg. Co.
Square D Co.
Westinghouse Elec. & Mfg. Co.

Switches, Thermostat Controlled
Colt's Patent Fire Arms Mfg. Co.
General Elec. Co.
Hart Mfg. Co.
Thermador Elec'l Mfg. Co.

Switches, Time
General Elec. Co.
Maydwell & Hartzell, Inc.
Sangamo Elec. Co.

Switchgear
Allis-Chalmers Mfg. Co.
General Electric Co.
I-T-E Circuit Breaker Co.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.

Tapes—Friction and Rubber
Clifton Mfg. Co.
Geo. E. Honn Co.

Telephone & Telegraph Hardware & Specialties
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Hubbard & Co.
Maydwell & Hartzell, Inc.

Telephone Systems—Private
American Automatic Elec. Sales Co.

Terminals, Cable
General Cable Corp.
General Elec. Co.

Testing Devices
Superior Switchboard & Devices Co.

Tools
Mathias Klein & Sons
Maydwell & Hartzell, Inc.

Tools, Live Line
A. B. Chance Co.
James R. Kearney Corp.
Sangamo Elec. Co.
Wiremold Co.

Tools, Tree Trimming
Bartlett Mfg. Co.

Transformers
Allis-Chalmers Mfg. Co.
American Transformer Co.
Gardner Elec. Mfg. Co.
General Elec. Co.
Jeffries Transformer Co.
Line Material Co.
Western Transformer Co.
Westinghouse Elec. & Mfg. Co.

Tubing, Elec'l Metallic
Aluminum Co. of America
Youngstown Sheet & Tube Co.

Turbines
Allis-Chalmers Mfg. Co.
Pelton Water Wheel Co.
S. Morgan Smith Co.

Valves
Ohio Brass Company
Pelton Water Wheel Co.
S. Morgan Smith Co.

Washers, Clothes
Easy Washing Machine Corp.
Edison Gen. Elec. Appliance Co.
General Elec. Co.
Landers, Frary & Clark
Norge Division, Borg-Warner Corp.
Westinghouse Elec. & Mfg. Co.

Wattmeters
General Elec. Co.
L. A. Nott
Roller-Smith Co.
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec. Instrument Corp.

Water Wheels
Pelton Water Wheel Co.
S. Morgan Smith Co.

Wire
Aluminum Co. of America
American Steel & Wire Co.
Columbia Steel Co.
Crescent Ins. Wire & Cable Co.
Crucible Steel Co.
General Cable Corp.
General Electric Co.
Hazard Ins. Wire Works
Indiana Steel & Wire Co.
C. E. Ingalls
Keystone Steel & Wire Co.
Maydwell & Hartzell, Inc.
The Okonite Company
Pacific Wire Rope Co.
Providence Ins. Wire Co.
Rockbestos Products Corp.
John A. Roebling's Sons Co.
Triangle Conduit & Cable Co., Inc.
United States Steel Corp.
Westinghouse Elec. & Mfg. Co.
Wiremold Co.

Wiring Supplies
Airey Co., F. J. 9
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Irvington Varnish & Insulator Co.
Killark Elec. Mfg. Co.
McGill Mfg. Co.
Westinghouse Elec. Supply Co.

● INDEX TO ADVERTISERS

MARCH, 1938

Allis-Chalmers Mfg. Co. 11
Aluminum Company of America 50

Brewer-Titchener Corp., The 51
Burndy Eng'g Co., Inc. 87

California Oregon Power Co. 66, 67
Chicago Flexible Shaft Co. 87
Colt's Patent Fire Arms Mfg. Co. 92
Corning Glass Works 54
Crocker First National Bank 86

Edison General Elec. Appliance Co., Inc. 12, 13
Everstick Anchor Co. 88

Frigidaire Corporation 14

G.C.A. Mfg. Co. 90
General Electric Company 2, 4, 10, 19, 20, 22, 83, 89
Graybar Electric Co. 6

Honn Co., Geo. E. 88
Hubbard and Company 49

Idaho Power Company 66, 67
Indiana Steel & Wire Co. 84
International Nickel Co., Inc., The 5

Jeffries Transformer Co. 82

Klein & Sons, Mathias 76

Landers, Frary & Clark 79
Lapp Insulator Co., Inc. 52
Lincoln Meter Co. 87

Malleable Iron Range Co. 7
Maydwell & Hartzell, Inc. 84
Montana Power Company, The 66, 67

Okonite Company, The 8
Okonite-Callender Cable Co., Inc. 8

Pacific Coast Electrical Bureau ..... Back Cover
Pacific Electric Mfg. Corp. 55
Pacific Gas and Electric Co. ..... Inside Back Cover
Pacific Power & Light Co. 66, 67
Pittsburgh Reflector Co. 21
Portland General Electric Co. 66, 67
Professional Directory 88
Puget Sound Power & Light Co. 66, 67

Reflector & Illuminating Co. 86
Reliable Electric Co. 80

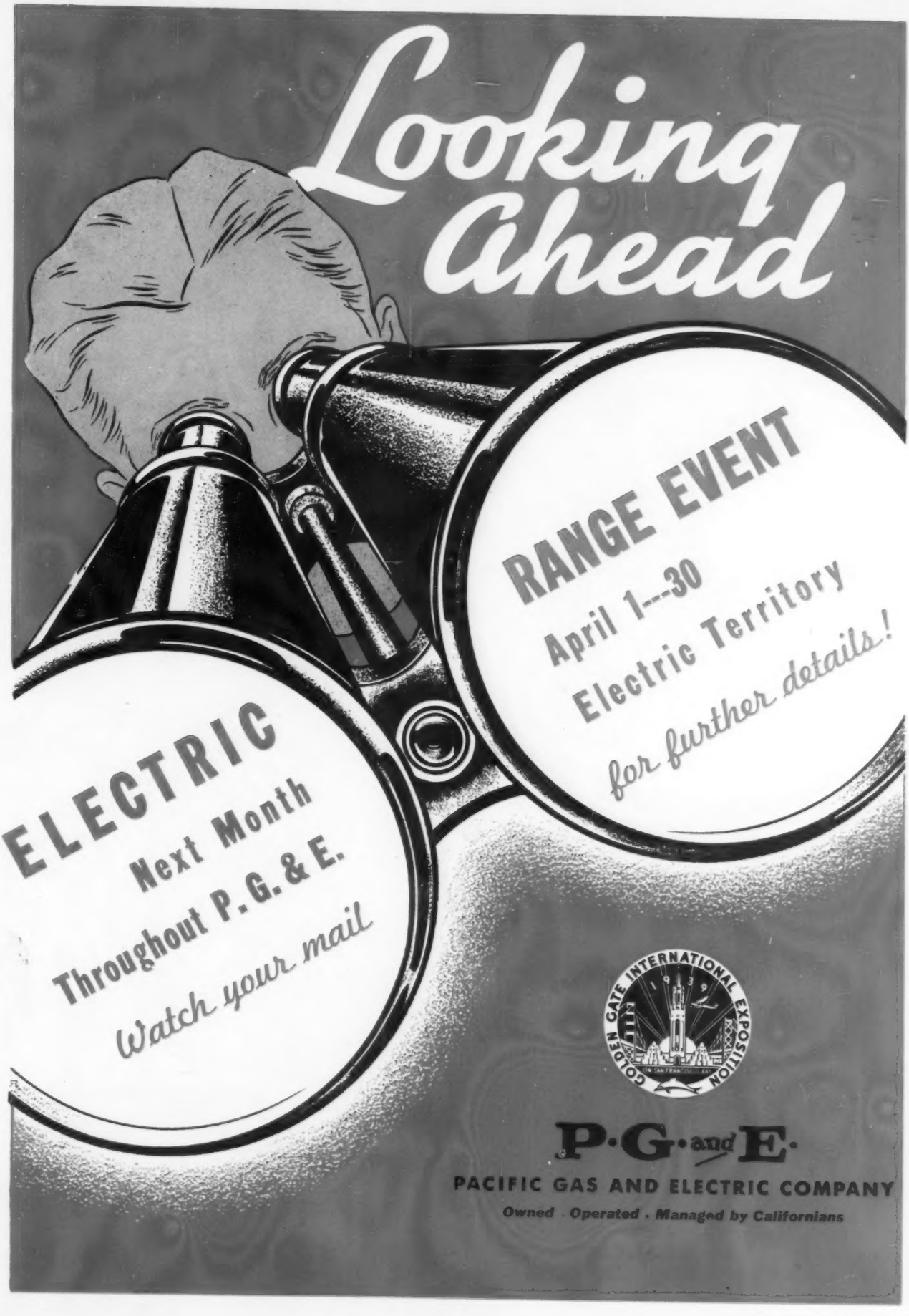
Sangamo Electric Co. 78
Schweitzer & Conrad, Inc. 85
Selectron Co., Inc. 84
Shell Oil Company 3
Smith Co., S. Morgan 53
Southern California Edison Co. Ltd. ..... Inside Front Cover
Square D Company 15
Standard Elec. Mfg. Corp., The 74
Superior Switchboard & Devices Co., The 77

Triangle Conduit & Cable Co., Inc. 18

Utah Power & Light Co. 66, 67

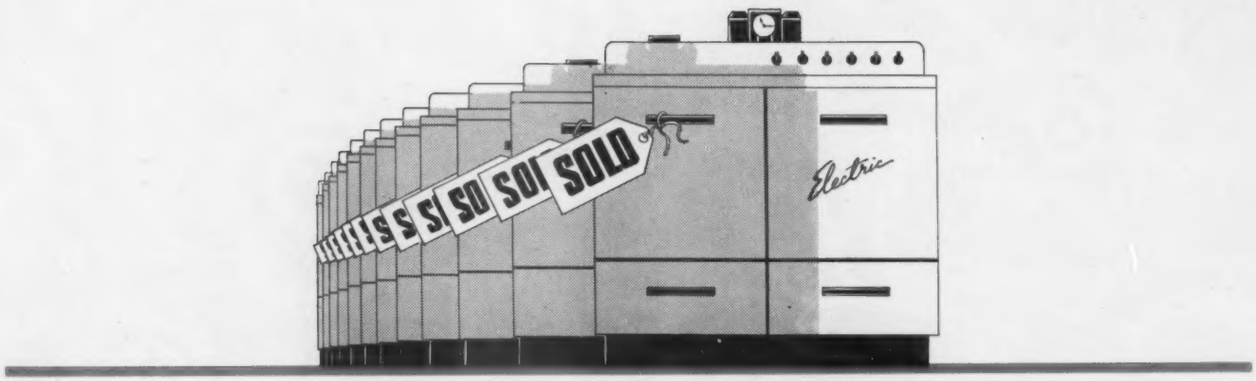
Ward Leonard Electric Co. 91
Washington Water Power Co. 66, 67
Westinghouse Electric & Mfg. Co. 9, 16, 17
Wiegand Co., Edwin L. 82

Youngstown Sheet & Tube Co. 75


Looking Ahead
RANGE EVENT
April 1---30
Electric Territory
for further details!
ELECTRIC
Next Month
Throughout P.G.&E.
Watch your mail
GOLDEN GATE INTERNATIONAL EXPOSITION
1939
P·G·and E·
PACIFIC GAS AND ELECTRIC COMPANY
Owned . Operated . Managed by Californians

EW 103-338

Ranges again lead the field in appliance gains



Among all major electrical appliances, ranges again lead the field in percentage of gain over the previous year's sales. In 1936, $41,413,-000 worth of ranges were produced and sold; in 1937, the total increased to $54,270,000, a gain of 31%. Water heaters were next with 24.7%, followed by ironers, refrigerators, cleaners and washers.

This rising tide of range sales is bringing bigger and bigger profits to the dealer's store. Electric range selling is now on a par with other appliances and encounters less resistance each season. The year 1938 will bring a rich reward to the dealer who devotes adequate selling effort to the electric range.

Pacific Coast Electrical Bureau

601 W. 5TH STREET, LOS ANGELES • 447 SUTTER STREET, SAN FRANCISCO